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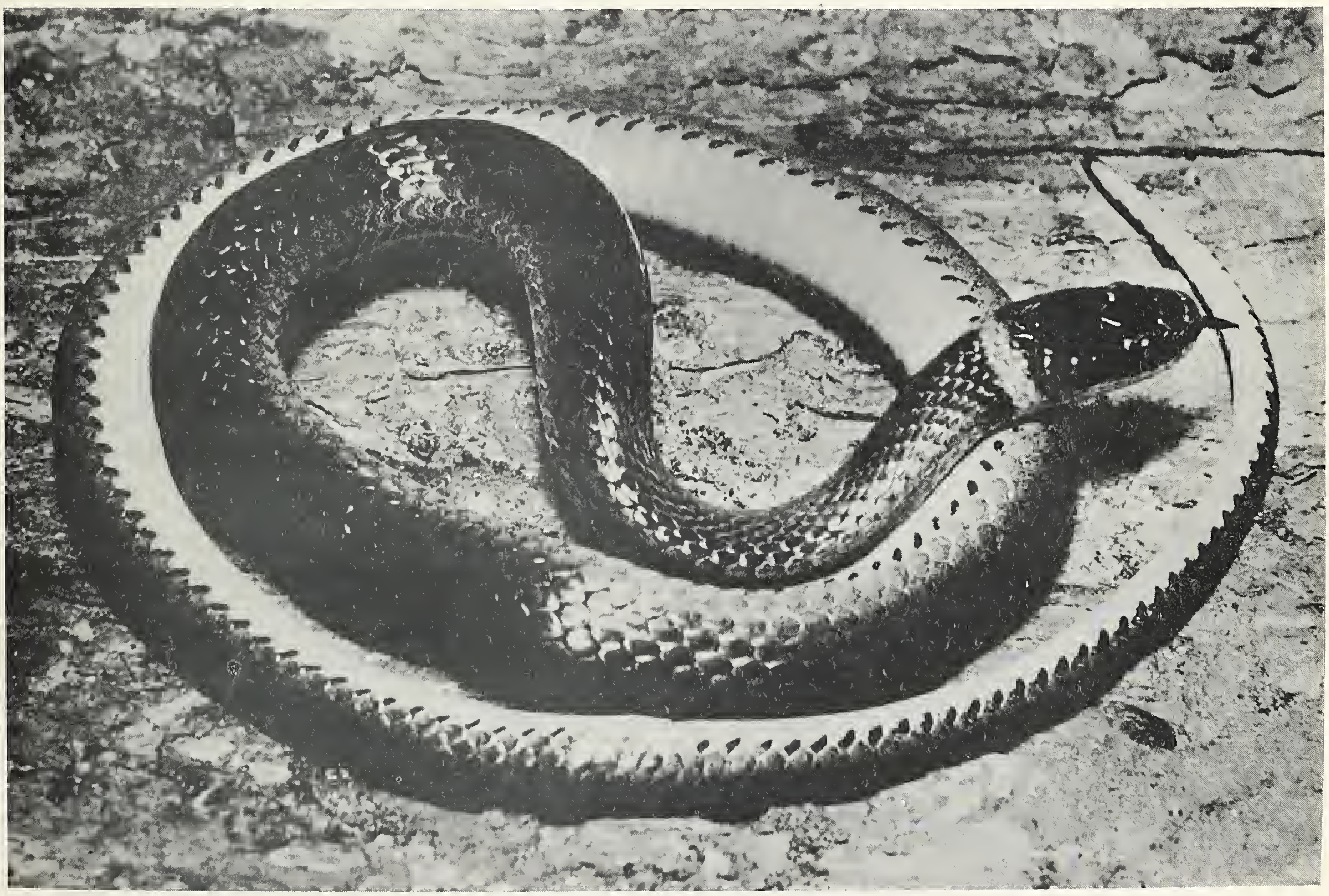
BULLETIN OF THE

Maryland Herpetological Society

The Natural History Society of Maryland, Inc.



MARCH 1971 VOLUME 7, NUMBER 1

Bulletin of the Maryland Herpetological Society
Volume 7 Number 1 March 1971

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The Cover: An adult *Diadophis punctatus edwardsi* from Swallow Falls State Park, Garrett County, Maryland. Photograph by Dr. R. S. Simmons.

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The Maryland Herpetological Society, Department of Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

IN MEMORIAM

JOHN ALLEN RAHNIS

1946 - 1971

John Rahnis, Airman 1-C, USAF, died as the result of an automobile accident January 19, 1971. He was secretary of The Maryland Herpetological Society in 1969. Beyond this, he was one of the most active members of the Organization, and a good friend to all of those who knew him. His tragic death is, indeed, a great loss to the Society.

BULLETIN OF THE mhs

Volume 7 Number 1 March 1971

The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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Volume 7 Number 1 March 1971

NOTES ON THE DISTRIBUTION AND ECOLOGY OF THE HERPETOFAUNA OF NORTHWESTERN MONTANA

Richard Franz

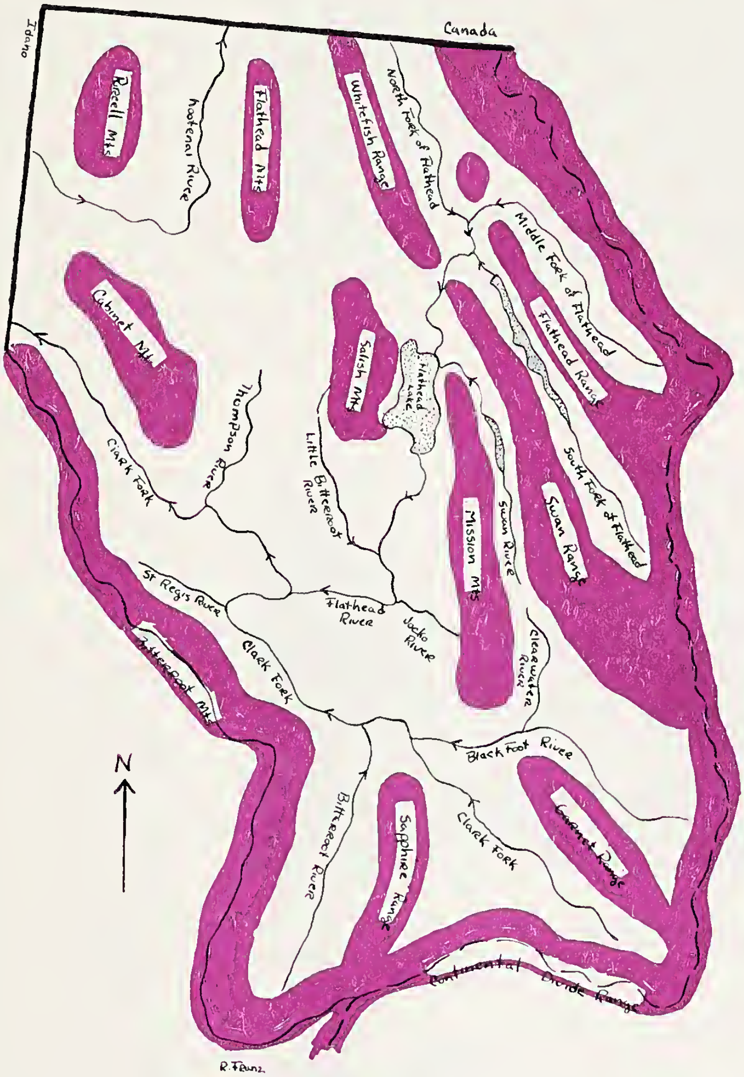

Figure 1. Map of northwestern Montana showing the mountain ranges, rivers, lakes, political boundaries.

Northwestern Montana is bounded on the west by the Bitterroot Mountains and Idaho, on the south and east by the Continental Divide Range, and on the north by the International Border and British Columbia (Canada) (Figure 1). The area contains eleven counties (Mineral, Sanders, Flathead, Lake Lincoln, Lewis and Clark, Missoula, Ravalli, Granite, Powell, and Deer Lodge). High mountain peaks (Mt. Evans, 10635 feet; Mt. Haggin, 10598; Mt. Cleveland, 10448; Kinta Peak, 10110) form the backbone of the Continental Divide Range (Figure 2).

Numerous tributaries of the Clark Fork and Kootenai Rivers carry snow melt west to the Columbia River and then onto the Pacific Ocean. At two points, tributaries of the Clark Fork are dammed by terminal moraines forming large, very deep, cold lakes. The lowest areas of the state (1820 feet) occur in the extreme northwestern corner, west of Libby.

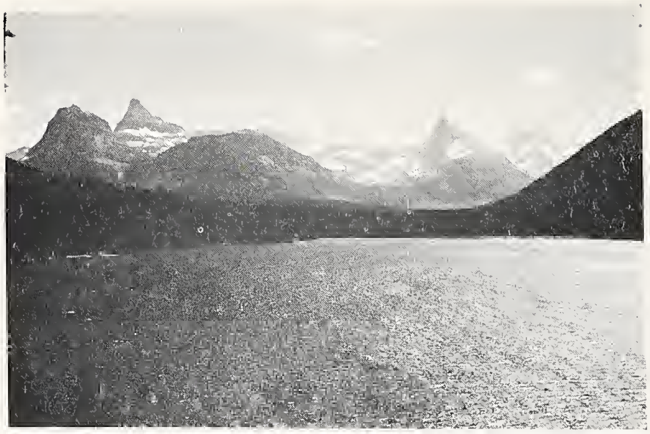

Figure 2. View of the Continental Divide Range from Lake St. Mary (Glacier National Park) showing glacially sculptured matterhorns, snow fields and glaciers.

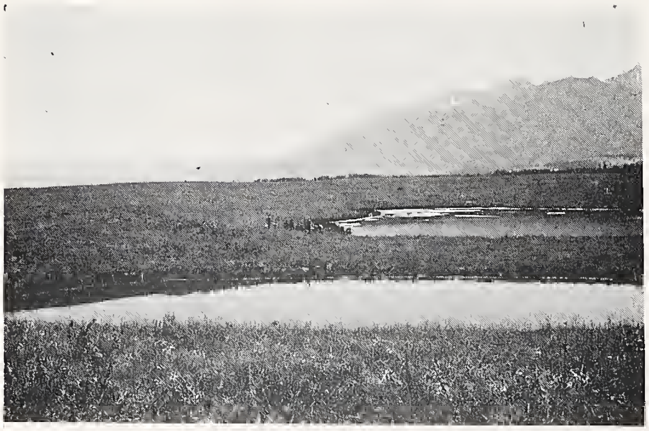

Figure 3. View of the alkaline "potholes" southwest of Flathead Lake; Mission Mountains in background.

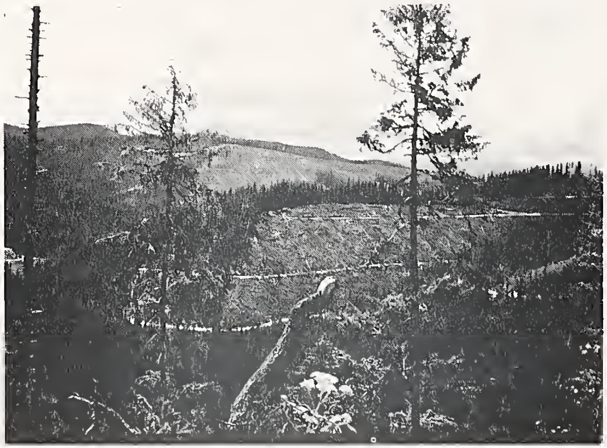

Figure 4. "Clear cutting" techniques used by the lumber industry throughout northwestern Montana.

Northwestern Montana is not only diverse in its natural scenery but also in its number of biologic communities which range from amictic glacial lakes in the high alpine-tundra along the Continental Divide to warm, alkaline ponds in the arid sagebrush desert-grasslands, south and west of Flathead Lake (Figure 3). This diversity can partially be explained by the region's erratic, sometimes tortuous, geologic history. Diastrophic features, particularly garbens, over-thrusts, faults and high mountains abound, indicating a long history of crustal movements. Both continental and valley glaciers have scarred the mountains and have pushed massive piles of rock and gravel forming moraines.

Within the boundaries of northwestern Montana there are many prominent mountain ranges which have modified the climate of this region. The Bitterroots act as an effective barrier to the warm moist air sweeping into the area from the Pacific Ocean. This mountain range forces the moisture-laden air to rise enabling it to cool, condense and fall as rain or snow on the western front of these mountains. After the air has risen sufficiently to pass over this range, much of the moisture is gone making the area, east of the Bitterroot Mountains, dry and arid - forming extensive grasslands and deserts. Again the air is forced to rise when it comes in contact with the Mission and Swan Ranges in the east-central portion of northwestern Montana allowing for more precipitation. Air passing through the extreme northwestern corner of the state is not stopped by the lower Purcell and Flathead Ranges allowing the moist air to penetrate as far east as the Continental Divide Range in Glacier National Park. Here the highest amounts of precipitation in the state are received. The vegetation of the state reflects the diverse amounts of precipitation that each area receives. Grasses, various composites, sagebrush and Pondrosa pine indicate low amounts of rainfall. Western larch and Douglas fir require higher amounts, and hemlock and cedar, the highest. Irrigation in the dry areas have enabled people to farm much of the grasslands, which of course, has destroyed much of the fauna and flora which originally inhabited this area. The only virgin grassland remaining is located in the National Bison Range (a protectorate of the federal government for over 60 years). Over grazing in the unirrigated areas have produced vast sagebrush deserts. The forested mountains have also felt devastation. Very little virgin timber still remains and what does exist is rapidly disappearing. For many years now the lumber industry has been employing "clear cutting" techniques (Figure 4). Fire follows the logging operation so that not even "seed trees" are left. Surely these activities have caused decreases in the number of small mammals, amphibians, reptiles and other assorted beast that frequented these cool, deep-shaded mountainsides. The waste trees are usually washed or dumped into nearby creeks causing log jams which in turn slows the flow of water allowing the streams to become warmer. This has probably caused the extinction of some populations of tailed frogs. Between the harsh climatic conditions, erratic recent geologic history and man's activities, the fauna and flora of northwestern Montana is in a constant state of fluctuation.

During my stay (summers- 1966 through 1969) at the Biological Station, University of Montana at Yellow Bay on Flathead Lake I had an opportunity to observe many amphibians, reptiles, aquatic insects and plants, that occur in northwest Montana. The following is an annotated list of the amphibians and reptiles which I had either observed or collected:

AMPHIBIANS

Ambystoma macrodactylum krausei- Northern Long-toed Salamander (Figure 5).

Records-FLATHEAD COUNTY: "Daphnia Pond" near Big Fork; Mud Lake, Glacier National Park; *Echo Lake; GRANITE COUNTY: *Kitchen Creek, near Missoula; LAKE COUNTY: 3.8 miles N of Polson, Route 35; Mission Well in Mission Mts., near Yellow Bay; MINERAL COUNTY: *Deer Creek, 3.5 miles SW of Haugen. (*refers to adult specimens)

Comments-Adults were collected from under boards at lake's edge (1 specimen) and under rotten logs on stream flood plain (3 specimens). Larvae were usually found in permanent, warm, weed-choked ponds except near Polson. At this locality, larvae were in a very cold (10° C), spring-fed pond containing dense mats of water cress *Nasturtium* and *Spirogyra*. Three larvae (total lengths- 18.2 to 24.5 mm.) from the pond near Polson were feeding on ostracods and cyclops. A few red water mites, several strands of *Spirogyra* and some green insect egg masses were also ingested. Larvae at Mission Wells and Mud Lake transformed during the first week of August; Polson population, the third week.

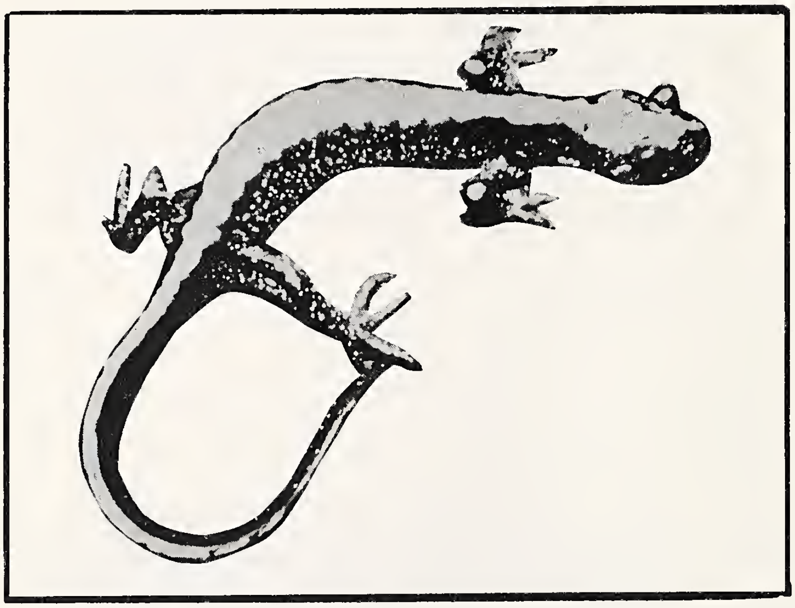

Figure 5. Northern long-toed salamander from Echo Lake, Flathead County. (Photograph by R. S. Simmons)

Ambystoma tigrinum- Tiger Salamander.

Dozens of ponds in the Flathead Drainage were seined or netted but the larvae or adults of this species were not found. The species was observed east of the Continental Divide in Alberta and Glacier County, Montana but apparently does not occur in northwestern Montana, west of the divide (at least not in the Flathead Drainage).

Dicamptodon ensatus- Giant Salamander.

While conducting a survey of the tailed frog, I made collections in 100 streams in Lincoln, Mineral, Flathead, Lake, Missoula and Powell Counties and did not find this species. Metter (1964) indicated that in Idaho this species occurs commonly in *Ascaphus* streams. Stebbins (1966) included the giant salamander in the herpetofauna of Montana but as far as I know, there are no actual specimens from this state.

Plethodon vandykei idahoensis- Coeur D'Alene Salamander.

Only three localities are known for species - 2 in Lincoln County and 1 in Mineral County. For a discussion of this species in Montana, see: R. Franz (1970) and K. Teberg (1964, 1965).

Ascaphus truei- Tailed Frog

Records- LEWIS and CLARK COUNTY: tributary of Copper Creek, tributary of the Black Foot River; MINERAL COUNTY: St. Regis River Drainage - Coyle Creek, Deer Creek, Flatrock Creek; Little Joe Creek, Silver Creek, Twelve Mile Creek, Ward Creek, East Fork of Big Creek, Middle Fork of Big Creek; MISSOULA COUNTY : Lee Creek near Lolo Pass, tributary of Bitterroot River; POWELL COUNTY: Morrell Creek, tributary of Clearwater River.

25 additional records from the Flathead River drainage were listed by R. Franz and D. Lee, 1970.

Comments- Adults of the tailed frog were encountered during the day under large rocks (12 to 18 inches) in the middle of fast streams (8 specimens), under rock chips in the splash zone of active weeps along streams (3 specimens) and under a log at the stream's edge (1 specimen); at night, individuals were active. Using a head lamp 11 specimens were collected in approximately 200 feet along the flood plain of Twelve Mile Creek. Their eyes reflected the head lamp's light and made capture rather easy. The larvae attach themselves (like leeches) with their sucker-like mouth to rocks in the fastest portions of streams. Population densities were small. In Twelve Mile Creek, the density was 0.2 tadpoles per square foot (mostly small individuals); at Flat Rock Creek, only 0.05 (mostly mature and transforming individuals (see Figure). Normally the coloration and

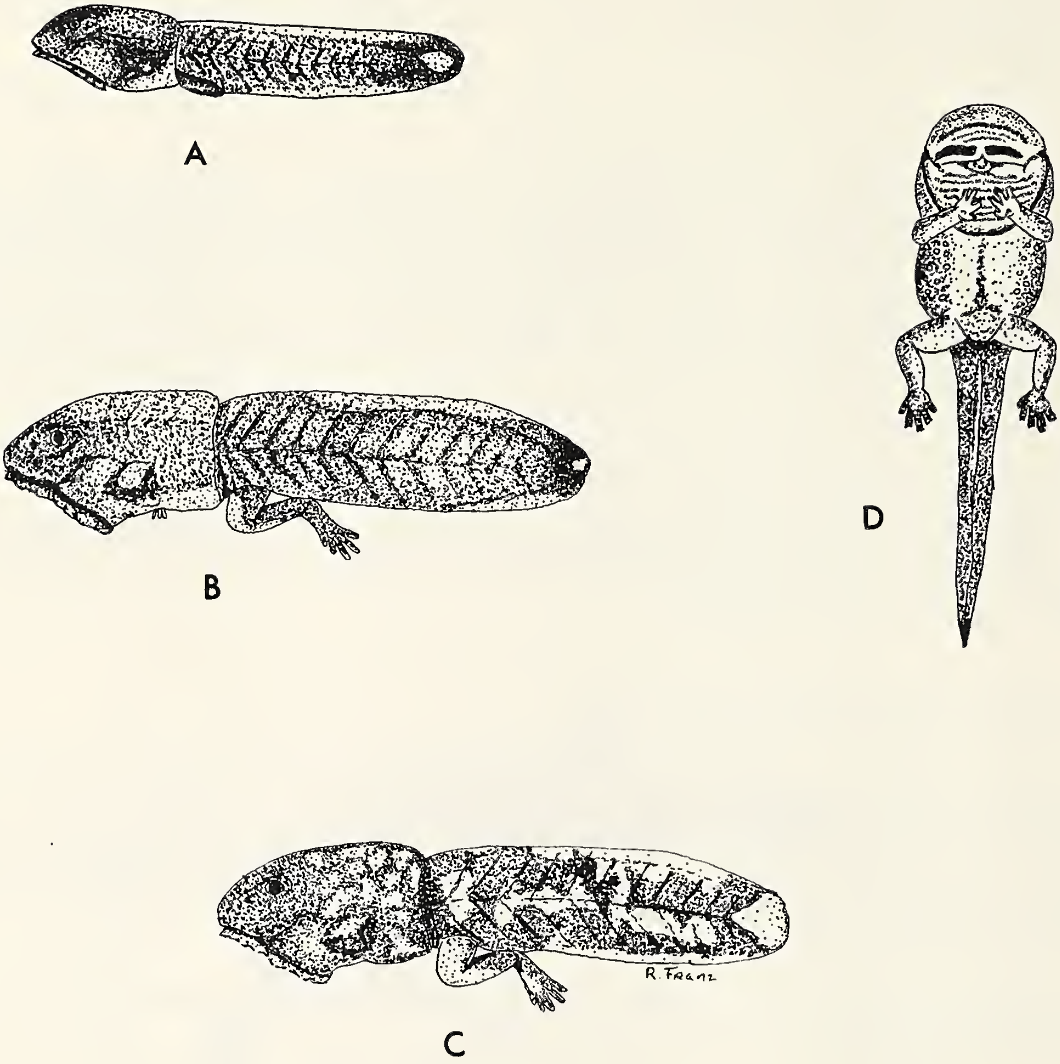

Figure 6. Larvae of the tailed frog from Twelve Mile Creek, Mineral County, Montana: A) 40 mm. larva having a medium sized tail spot; B) 62 mm. larva showing a small tail spot; C) 64 mm. larva showing mottled condition; D) transforming larva 60 mm. in length showing sucker-like mouth.

pattern of these larvae were slate gray to black and occasionally brown with a small white or cream spot at the terminus of the tail. Occasionally the spot was either very large or absent. Of the larvae collected a small number (28 individuals), all from Twelve Mile Creek, Mineral County, showed abnormal pigmentation. These specimens showed isolated pigment reduction on both the body and tail producing a mottled appearance (Figure 6). Each of these tadpoles had large orange tail spots. Approximately thirty-two percent of the sample from this tributary had aberrant coloration.

Both adults and larvae cannot tolerate warm water. Larvae will die at temperature over 16° C; adults tolerate somewhat warmer temperatures. At 1° C adults are torpid but larvae are actively swimming and may even feed. It is not uncommon to find laboratory larvae clinging to crystals of ice in the refrigerator containers.

Bufo boreas boreas- Boreal Toad.

Records- FLATHEAD COUNTY: Big Fork; Logan Pass in Glacier National Park; near Hungry Horse Dam; "Horse Pond' off Route 35; Swan Lake; White Fish Lake; LAKE COUNTY: Biological Station at Yellow Bay; Mission Dam at St. Ignatius.

Comments- Adults of this species were abundant in the forested areas especially near ponds and lakes. No specimens were seen in the grasslands south and west of the lake. The larvae were found in road ruts, temporary ponds and semi-permanent ponds. At "Horse Pond" the larvae occurred sympatrically with *Rana pipiens* tadpoles but the two species apparently did not compete for the same food items. This species fed primarily on blue green algae-*Oscillatoria* (59 percent); other important algae which were ingested were *Mougeotia* (28 percent) and *Desidium* (8 percent). *R. pipiens* fed on gree algae-*Desmidium* (46 percent). *Oscillatoria* (14 percent) and *Mougeotia* (9 percent) were also important.

Hyla regilla- Pacific Treefrog.

Records- LAKE COUNTY: near Woods Bay.

Comments- Ken Teberg found a specimen on the wind-shield of his car. Apparently the species is uncommon in the area.

Rana pipiens- Leopard Frog.

Records- LAKE COUNTY: Mission Dam at St. Ignatius; south end of Flathead Lake; "pothole" south of Ronan; Ninepipes.

Comments- This is a species of warm, weed-choked ponds and lakes. It has been taken sympatrically with *Rana pretiosa* at only one locality- Mission Dam.

Rana pretiosa- Spotted Frog.

Records- BEAVERHEAD COUNTY: Big Hole River near Jackson; FLATHEAD COUNTY: Swan River near Big Fork; Swan River near Swan Lake; Swan River near Condon; LAKE COUNTY: 3.8 miles N. of Polson off Route 35; Mission Dam near St. Ignathius; LEW and CLARK COUNTY: 2.3 miles W. of Flesher Pass, tributary of the Black Foot River.

Comments- This species frequents grassy margins along large, cold, swift streams and rivers. A large population exists sympatrically with *R. pipiens* at Mission Dam.

REPTILES

Chrysemys picta belli- Western Painted Turtle.

Records- FLATHEAD COUNTY: Echo Lake; Swan River near Big Fork; Whitefish Lake; Ashley Lake; LAKE COUNTY: upper Swan Lake; Biological Station at Yellow Bay; Ninepipes; "potholes" south of Ronan.

Comments- The western painted turtle occurs in shallow warm alkaline "potholes" with a high pH (9-10) (5 specimens), slower portions of cold rivers (8 specimens), warm acidic lakes (3 specimens) and cold glacial lakes (2 specimens). Juveniles bask on floating vegetation (*Ceratophyllum*, *Utricularia* and *Myriophyllum*); adults use logs and rocks.

Charina bottae utahensis- Rocky Mountain Rubber Boa.

Records- LAKE COUNTY: Mission Creek above Mission Dam (2 specimens).

Comments- Both were collected in the leaf litter in a deep shaded douglas fir-cedar forest.

Coluber constrictor- Racer.

Record- LAKE COUNTY: near Big Arm.

Comments- A shed skin of *Coluber* was found in a "gravel pit" in the grassland community on the dry western side of Flathead Lake. Eight upper labials were present indicating that the specimen was probably the western subspecies *C. c. mormon*.

Pituophis melanoleucus- Bullsnake.

Record- LAKE COUNTY: 6.9 miles N. of Arlee on Route 93 (DOR).

Comments- The surrounding area was rocky and quite xeric. Sagebrush (*Artemis*) was common. According to Stebbins, *P. m. sayi* occurs in this area.

Thamnophis sirtalis- Common Garter Snake.

Records- FLATHEAD COUNTY: "Daphnia Pond" near Big Fork, Swan River near Big Fork; LAKE COUNTY: upper Swan Lake; "potholes" south of Ronan; Mission Dam; near Mission Falls; 3.8 miles N. of Polson; Biological Station at Yellow Bay.

Comments- This species was associated with small weed-choked sloughs and ponds (25 specimens), cold spring-fed ponds (3 specimens), glacial lakes (2 specimens) and along dry dusty mountain trails (10 specimens). On one occasion, a large specimen was found attempting to eat a large leech. According to Stebbins (1966), populations in this area are intergrades between *parietalis* and *fitchi*.

Thamnophis elegans vagrans- Wandering Garter Snake.

Records- FLATHEAD COUNTY: near Big Fork; LAKE COUNTY: upper Swan Lake; "potholes" south of Ronan; 3.8 miles N. of Polson; Mission Falls; Mission Dam.

Comments- This species appeared to prefer drier habitats than those occupied by *T. sirtalis*. They were particularly abundant along dry dusty mountain trials (32 specimens).

Crotalis viridis viridis- Prairie Rattlesnake.

Records- LAKE COUNTY: National Bison Range; MINERAL COUNTY: 4 miles E. of St. Regis along Route 461 (DOR); SANDERS COUNTY: 1 mile E. of jct. of Clark Fork River and Flathead River.

Comments- Three specimens were found (DOR) in rocky, sagebrush deserts. Apparently they had been moving at dusk when they were killed. The species is probably restricted to the dry, rain-shadow area, west of Flathead Lake.

According to Stebbins (1966), three other species occur in northwestern Montana. These are the rough-skinned newt (*Taricha granulosa*), the western skink (*Eumeces skiltonianus*) and the northern alligator lizard (*Gerrhonotus coeruleus*). Numerous local people indicated that the two lizards have been seen on the islands in Flathead Lake.

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THE ORIGIN OF SNAKES

Steven P. Christman

SYNOPSIS. Existing knowledge concerning the origin and classification of snakes is reviewed. Two schools of thought are quite opposite: One has the snakes evolving from monitor-like lizards with the boids as the most primitive living group; the other claims the small burrowing snakes are the most primitive, having evolved from the degenerate burrowing lizards. Neither is the classification of snakes an area of agreement. Some place the viperidae as the most advanced family, others the colubridae.

Part One
Theory on the Evolution of Snakes

ERA	EPOCH or PERIOD	YEAR at START	
Cenozoic	Recent	8,000 bp	
	Pleistocene	2 mil. bp	
	Pliocene	12 mil. bp	
	Miocene	25 mil. bp	first colubrids
	Oligocene	36 mil. bp	
	Eocene	58 mil. bp	
	Paleocene	63 mil. bp	
Mesozoic	Cretaceous	135 mil. bp	first snakes
	Jurassic	181 mil. bp	
	Triassic	230 mil. bp	first lizards
Paleozoic	Permian	280 mil. bp	
	Pennsylvanian	345 mil. bp	first reptiles
	Mississippian	405 mil. bp	first amphibians
	Earlier periods		

Table I

Geologic time scale

The living reptiles are divided into four orders: The Crocodilia, the Chelonia, the Rhynchocephalia (the tuatara), and the Squamata, which includes three suborders; the Sauria, the Serpentes and the Amphisbania. There are about three hundred genera of snakes known today, and some three thousand species (Bellairs, 1957).

Before we get into what is known and theorized about the origin of snakes ,a brief review about the reptiles in general might be in order.

The reptiles were the first vertebrates that did not depend upon water (except, of course for drinking). Animals before them (especially the amphibians) had developed means for a terrestrial life in the adult stages, but still had to return to the water to reproduce. But the reptiles could turn completely away from the aquatic life, because they had developed the amniote egg. Briefly, this is merely a type of egg that is enclosed in a membrane (the amniotic membrane) so that the vital fluids necessary to life are constantly available. As a matter of fact, the egg-laying reptiles have developed a hard leathery shell to prevent loss of moisture through evaporation. In the many reptiles which give birth to living young, the egg is merely retained in the body, covered by the anmiotic membrane; the shell is lacking. So now that the problem of returning to the water to reproduce had been eliminated, the reptiles were free to radiate and adapt to many new niches on land.

The first reptiles probably derived from primitive Labyrinthodonts in the Pennsylvanian period of the Paleozoic era, some 345 million years ago (Dodson, 1960). They increased in numbers and importance until their "climax" in the Mesozoic, known as the "Age of Reptiles". The lizards first appeared in the Jurassic period, about 181 million years ago. For the next fifty million years, the dinosaurs predominated on land, while the lizards reverted back to the water. They were still lung-breathing, amniote egg-laying animals, of course, but merely found it better to take up the aquatic side of life and leave the land to the larger and more powerful dinosaurs. Both groups reached their climaxes at about the same time in the late Mesozoic, but the dinosaurs had died out completely by the end of the Cretaceous (Pope, 1955). Many of the lizards survived, and these were now free to return to the land and fill recently vacated niches.

The origin of snakes is not one of the better known fields of evolutionary study. Pope (1955) said, "The evolutionary tree of the extinct groups of snakes will never be constructed in detail." Because the bones of snakes are so tiny and fragile, few respectable fossils have been found. Unlike strictly aquatic forms which may die and sink to the bottom to be covered with successive layers of silt, snakes are generally terrestrial and require a much more traumatic death to preserve their skeletons.

There are two theories concerning the evolution of snakes from the lizards. The first, pioneered by Bellairs (1957), Schmidt (1950) and others, proposes that the serpents came from the monitor-type lizards. The mosasaurs, primitive relatives of the present-day monitors, reached their peak during the last few million years of the Mesozoic era. It was from these lizards that the first snakes evolved. The earliest known snakes are from about the same time, roughly 135 million years ago.

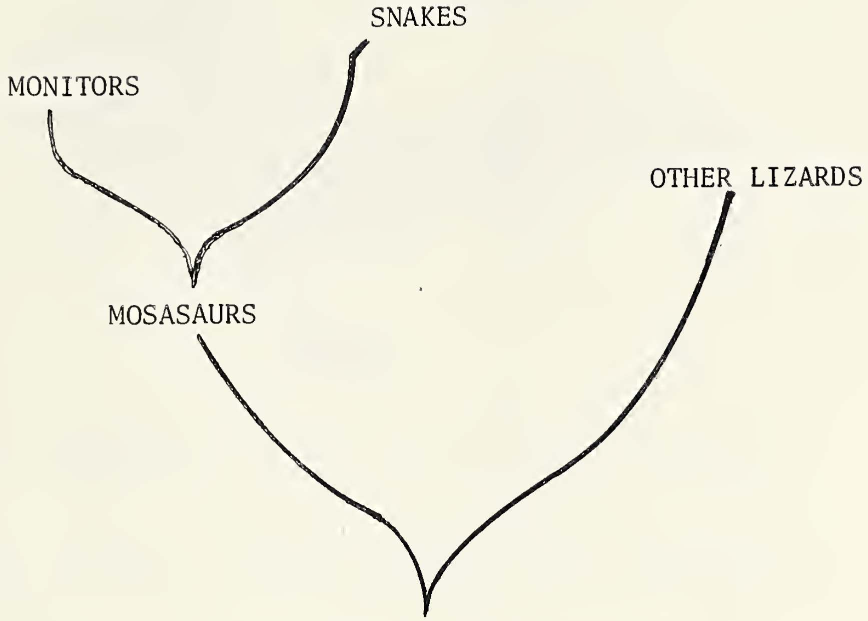


Figure I
Derivation of snakes from mosasaur stock.

Pachyophis, *Mesophis*, *Madtsoia* and *Gigantophis* are all related to the Boidae (Oliver, 1958). Many more fossil snakes are known from the Eocene period of the Cenozoic era, forty to sixty million years ago. The more advanced families of snakes (Viperidae, Elapidae and Colubridae) are known from earlier than the Miocene (Carroll, 1969).

Schmidt (1950) recognizes two types of snakes: Those he calls the generalized, and those he calls the specialized. Specialized snakes are those that have evolved down a straight and narrow path, and are not free to radiate or fill new niches other than their own small one. Generalized snakes are taxonomic groups that have and are presently radiating and evolving for new ways of life. Among the generalized families the Boidae are considered primitive. The small burrowing snakes are considered very specialized and therefore could not possibly be the forerunners of the remainder of the snakes.

Besides the fact that the earliest known snakes are boas, there are other reasons to consider the Boidae as the most primitive family of snakes : Although the Boidae is not the only family of snakes with a vestigial pelvic girdle, it is the only family with external claws (called spurs). It is one of only a couple of families with a reduced second lung. Most snakes have one lung; lizards have two. But the key to the whole argument is generalization. The Boidae is a generalized family of snakes, and seems the likeliest to have founded the present groups of snakes.

Attempts have been made to design a hypothetical "ancestor snake" which would have been the forerunner of modern serpents. These usually result in a non-specialized terrestrial-aquatic snake that probably looks much like the anaconda or the Boa constrictor.

Bogert and McDowell (1954) present outstanding evidence that the prototype boid snakes evolved from the monitor-like lizards related to the present day *Lanthanotus* (sometimes placed in its own family, the Lanthanotidae). Their scheme is pretty much in agreement with Schmidt (1950) and others except that they reject the Mosasaur stock in favor of the *Lanthanotus* stock. They contend that *Lanthanotus* is the closest living relative of the snakes. Among the similarities they list are:

> Absence of external ear in both *Lanthanotus* and snakes.
>
> A transparent window in the eyelid of *Lanthanotus* that would have evolved to the always-open condition in snakes.
>
> Similarities in skull structure.
>
> Similarities in dentition and structure of the tongue.

They also point out that although this lizard has well developed legs, it is quite snake like in appearance, being elongated, with the fore legs set back quite far on the trunk. Also, the inability of the tail to regenerate in the Varanidae is rare among lizard families, but common to all snakes.

Figure III shows the classification of snakes as derived from the works of Schmidt, Bellairs, and Bogert, and McDowell. It is indicated that the snakes with the highly specialized venom-injecting apparatus are the most advanced groups. Indeed, Schmidt (1950) considers this about the most important characteristic on which to base a phylogenetic scheme. These students believe that boas are the most primitive living snakes and gave rise to the specialized burrowing forms such as Typhlopidae and Leptotyphlopidae, as well as the rest of the snakes.

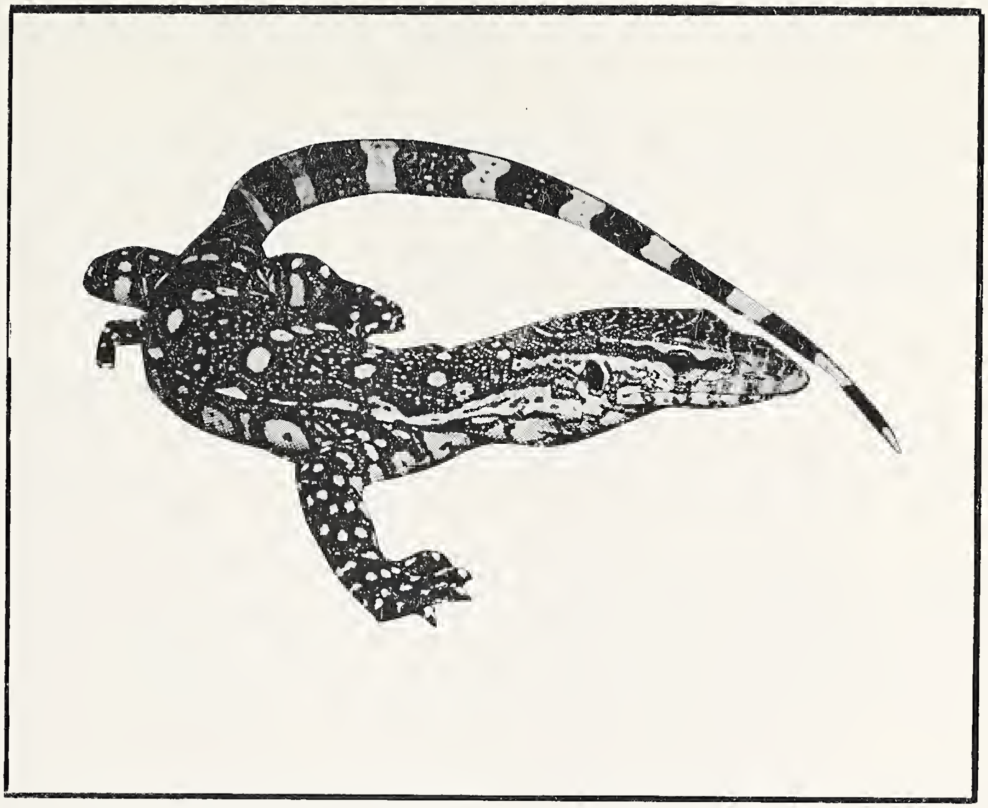


Figure II
Varanus niloticus, related to *Lanthanotus*, shows the general "snake-like" appearance of the lizards.

According to Schmidt (1950), these burrowing snakes are examples of regressive evolution, and similarities between them and certain burrowing lizards are examples of convergence for similar ways of life. As a matter of fact, Bogert and McDowell (1954) contend that the Typhlopidae are not snakes at all, but are a family of lizards! They make their conclusions on the basis of skull structure. The family Leptotyphlopidae, they recognize as degenerate lizard-like snakes.

The second theory concerning the origin of snakes is that proposed by Walls (1942) and more recently Underwood (1967).

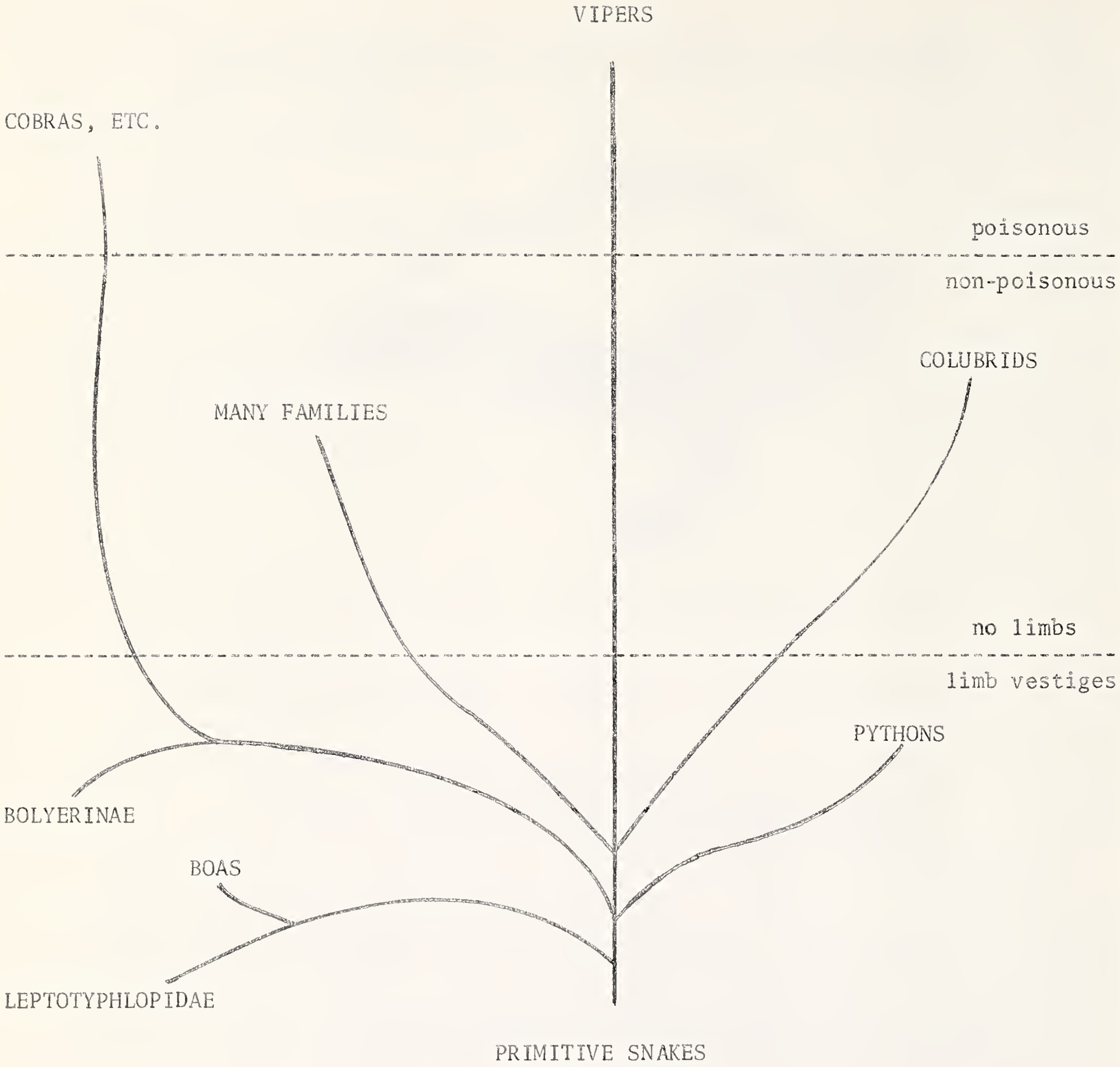


Figure III

Possible relationships among snakes. Adapted from Schmidt (1950), 'Modes of Evolution Discernible in the Taxonomy of Snakes".

Dr. Walls points to the eye of snakes as an indication of their evolution. He has found many similarities between the eye of some of the legless burrowing lizards and the burrowing snake families Leptotyplopidae and Typhlopidae. He outlines the steps in the evolution of the "glassy stare" common to all snakes:

1. In burrowing lizards, the lower eyelid acquired a small transparent window. (this is present in several modern forms.)

2. This window gradually grew in size until it became fixed to the reduced upper eyelid.

3. Eventually the window replaced both eyelids as an immovable convex cap,

His conclusion, then, is that the burrowing snakes are the most primitive forms, having arisen from burrowing lizards.

Dr. Underwood reaches the same conclusion, but uses much more data to substantiate the position. Trunk and jaw musculature, body chemistry, dentition, skull bones, and internal organs are only a few of the many comparisons he makes among the living snakes. He rejects the idea that the Typhlopidae are lizards, and goes on to reject most of what has been believed concerning snake classification!

Underwood (1967) shows the classification of the snakes arising from the burrowing lizards to the highest group, the Colubridae. He states that the boid snakes gave rise to the poisonous elapids and vipers, and these then were the forerunners of the common harmless snakes Colubridae.

The subject is not closed. Since snake fossils are so uncommon, theory of evolution is based upon comparison of living forms. As more fossils are found, perhaps more light will be shed on the subject. When scientists using essentially the same data can come up with such completely opposite views, it's easy to see that opinion can play a role in the final analysis.

Bellairs (1942) said that the snakes may be regarded "as little more than a group of specialized lizards." When herpetologists cannot even agree on the disposition of entire families, maybe he had something there.

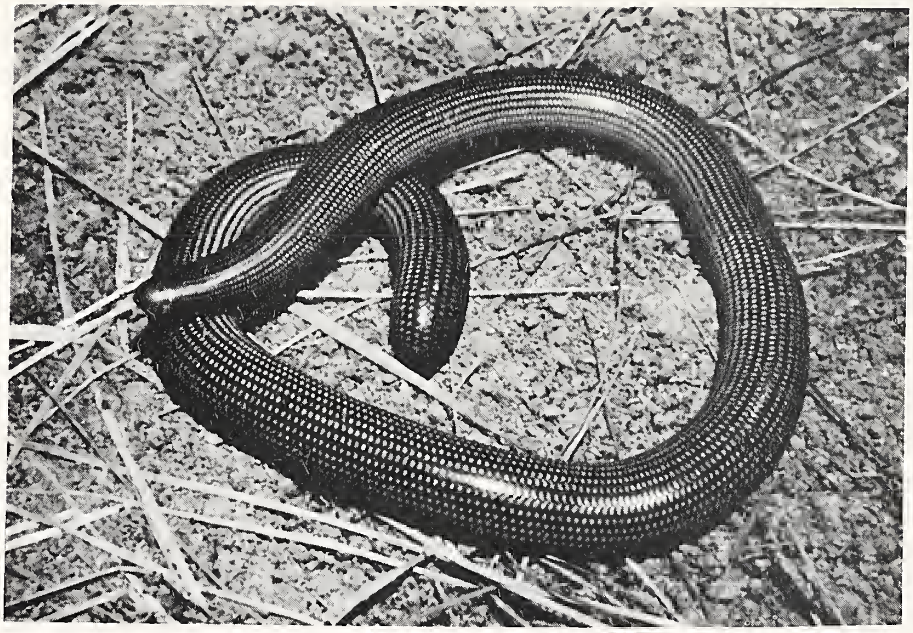


Figure IV
A *Typhlops* from Africa

Part Two
Significance of Adaptive Radiation in the Boidae

Underwood's (1967) classification involves parallel gaining and loss of various organs constantly. Venom injecting apparatus is gained and lost a couple of times. The structure of the jaws modify, and then revert back in still higher forms. And so on. This scheme has not been met with total agreement among herpetologists.

The more conservative theory which places the boids as the first snakes seems to have some pretty good points. However, like Underwood's plan, there are still many unanswered questions. Among these are: How did the rest of the snakes evolve from the boids or preboids? What role did adaptive radiation in the Boidae play in this evolution?

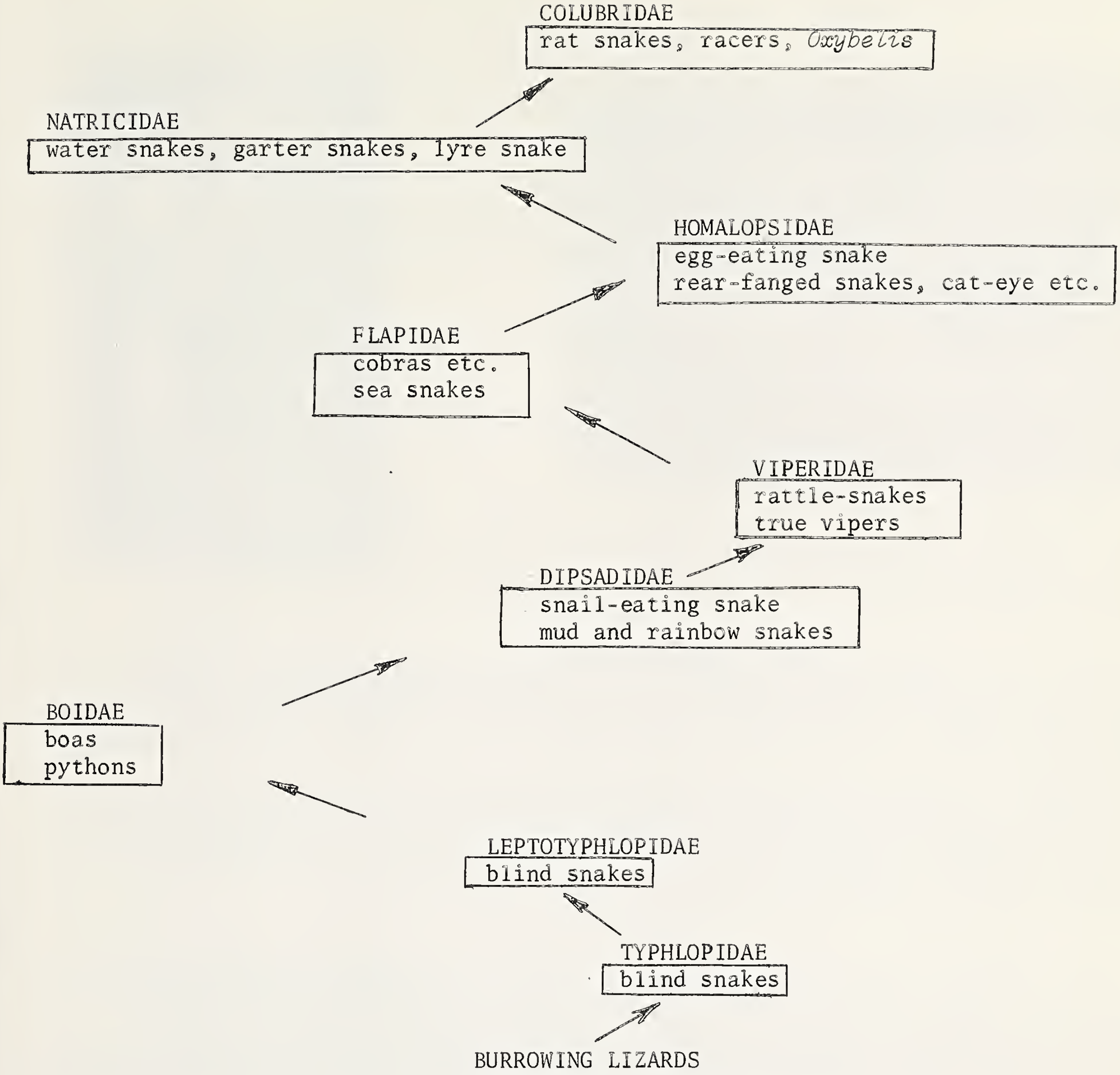


Figure V

Underwood's Classification

Boxed entries are representatives of families. Each line within a box contains examples of *different* subfamilies in that particular family. No attempt has been made to deduce relationships on other that a liner basis. From Underwood (1967) "A Contribution to the Classification of Snakes".

There are three subfamilies in the family Boidae, differing primarily in skull structure and head scutellation.

On the basis of skull structure, and other information, the Bolyerinae probably evolved the cobras and their allies (Pope, 1955, and others).

The Pythoninae do not exhibit the wide range of habitat adaption characteristic of the subfamily Boinae.

There are basically three "types" of Boinae: The unspecialized ground-living snakes; the specialized burrowers, and the specialized arboreal snakes.

Among the boas that live primarily on the ground, the anaconda and the boa constrictor are typical, and may well resemble the predecessors of modern colubrids.

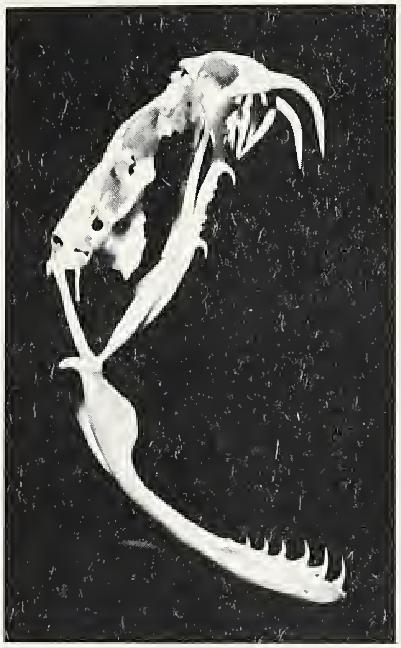
Many of the boas are small specialized burrowers. These snakes have blunt tails, specially designed jaws for pushing in the soil, and smooth scales. It is likely that the families Leptotyphlopidae and Anilidae are derived from this group of boas (Schmidt, 1950). And perhaps some of the specialized burrowers in the Colubridae came from here.

There are two points to consider concerning the arboreal snakes: The evolution of an elongated body form, and the evolution of enlarged front teeth necessary for grasping birds, upon which most tree-dwellers feed. Among the boas, the tree boas are the slenderest, but they cannot compare with some of the wire-like arboreal colubrids.

However, the tree boas do show amazing specialization in the front teeth of both jaws. Figure VI shows the uncanny similarity between the elongated teeth of a typical tree boa (*Corallus*) and the fangs of a rattlesnake.

The tree boa's teeth are not hollow, nor does he have venom glands, but in evolutionary study where so much theory is incorporation from dentition, they do present an interesting similarity. Is it possible that these arboreal boids eventually gave rise to fanged snakes? It seems probable that the arboreal colubrids, at least evolved from tree boa stock.

Concrete answers in evolutionary study are hard to come by. I have not provided any. We need much more comparative work to fill the gaps in our knowledge. No one character is known that would demonstrate relationships among the snakes. As



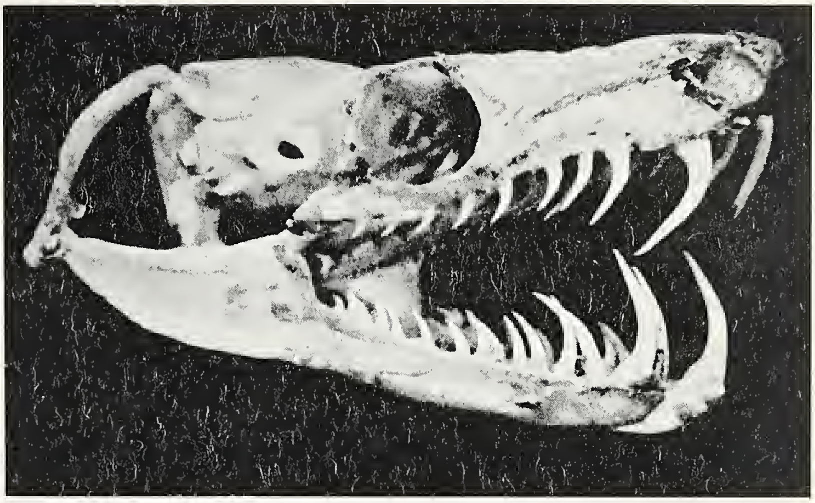


Figure VI
Comparison of the skulls of *Corallus* and *Crotalus*

a matter of fact, students use many criteria, and not always the same ones to classify the various groups of snakes. Hopefully the recent interest in chromosome types will help.

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Notes on the Food of the Dwarf Salamander

On the afternoon of 18 June 1969 Roger Sanderson and I collected numerous dwarf salamanders, *Manculus quadridigitatus*, 2 miles N. Citra (US Rt. 301), Alachua County, Florida. The salamanders were found in large mats of pennyworts, *Hydrocotyle americanus*, floating in 3-4 feet of water. Fifteen individuals (19-33.5 /25.5/ mm S-V length) were preserved immediately in 10% formaldehyde. The digestive tracts of these salamanders were later removed, and under a dissection microscope, examined for food contents. Four *Manculus*, still in their larval form (19-24 mm S-V length), did not reveal any distinguishable food items. The remaining specimens, all adults, had 3-15 (5.91) food items per individual. With the exception of four beetle larvae found in one *Manculus* and possibly two mites found in another, all food items represent non-aquatic species (Table 1). Food items ranged in size from less than one mm (mite) to 5 mm (spider, Lycosidae). Many items showed little indication of digestion, suggesting that the salamanders were actively feeding at the time of collection.

This data would also suggest that in this population of *Manculus* foraging time is spent on or just above the water surface, feeding on small invertebrates associated with the emergent leaves of *Hydrocotyle*. This would tend to reduce possible competition with feeding newts, *Notophthalmus viridescens*; sirens, *siren lacertina*; dwarf sirens, *Pseudobranchus striatus*; and amphiumas, *Amphiuma means* which all occur in this particular plant community.

Table 1: Food items of *Manculus quadridigitatus* (15 specimens)*

	Total No. of items	No. of salamanders containing item	Per cent frequency
ARACHNIDA			
Araneae	9	6	14.2
Acarina	2	1	3.2
INSECTA			
Hemiptera	3	1	4.7
Coleoptera			
adults	11	7	17.5
larva	4	1	6.3
Diptera	16	7	25.4
unidentified** (parts)	18	8	28.6

---

*Carr (1940) likewise noted that beetles (adults and larva) and spiders as well as earthworms were frequenly consumed by this salamander.

**removed from the lower digestive tract, many of these parts undoubtedly represent above mentioned insects.

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—David S. Lee, *Department of Mammalogy, Natural History Society of Maryland.*

Eggs of the Soft Shell Turtle in Gopher Tortoise Burrows

It is well known that the burrow of the gopher tortoise, *Gopherus polphemus*, provides shelter and protection for many animals (Carr, 1940; Carr, 1952; Young and Goff, 1939). I would like to suggest one more species which may occasionally make use of Gopher burrows.

During extensive collecting of a rosemary scrub habitat, 1.3 miles north west of Avon Park, Highlands County, Florida a number of active tortoise burrows were excavated. On 11 October 1968 while examining one of these burrows, three soft shell turtle, *Amyda ferox*, eggs were uncovered. All three eggs were imbedded in the side of the burrow at a point approximately six feet from the entrance of the burrow at a depth of four feet. Additional eggs may have been overlooked because of problems in excavating this particular burrow. One egg was cracked and undeveloped, while the other two were intact. Of these two remaining eggs one was opened and contained a live fully developed turtle. The other egg was placed in box containing damp paper towels. Two weeks later on October 25, this egg hatched.

The tortoise burrow from which the eggs were collected was located within sixty feet of a small sink pond and approximately 100 feet from a small creek. The soil were the eggs were found was composed of damp relatively cool sand.

Eggs laid in the tortoise burrow may have some advantages over those laid on the surface. The dry sand and high temperature of a scrub would appear very detrimental to soft shell turtle eggs while the burrow provides a moist environment with a fairly constant temperature.

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—Roger A. Sanderson, *816 Howard Terrace, Winter Haven, Florida 33880.*

A corn snake, *Elaphe guttata guttata,* from Western Maryland

The distribution of the corn snake, *Elaphe guttata guttata* (Fig. 1), had appeared to be Coastal Plain in Maryland with slight encroachment onto the Eastern Division of the Piedmont Province at Loch Raven in Baltimore County and near Wheaton in Montgomery County (McCauly, 1945; Cooper, 1960; Harris, 1969). In Virginia, however, this species has been found along the Blue Ridge and Appalachian Mountains as far north as Stephens City in Frederick County as well as on the Coastal Plain (Tobey, 1970).

On 1 November 1969 I collected a juvenile corn snake in Washington County, Maryland. The specimen was found just above the Potomac River one half mile west of Tonoloway Ridge on a rock outcrop eight feet above the Western Maryland Railrod tracks. This record extends the range of this species approximately 35 miles north from the Stephens City, Virginia locality and places the corn snake in the Valley and Ridge Section of Maryland. These two populations, one on the Coastal Plain and the other along the Blue Ridge and Appalachian Mountains, appear to be disjunct in both Maryland and Virginia. The specimen is catalogued NHSM 1692 in the collection of the Natural History Society of Maryland.

I would like to thank Mr. Franklin Tobey and the Virginia Herpetological Society for providing the Virginia distribution data from their maps.

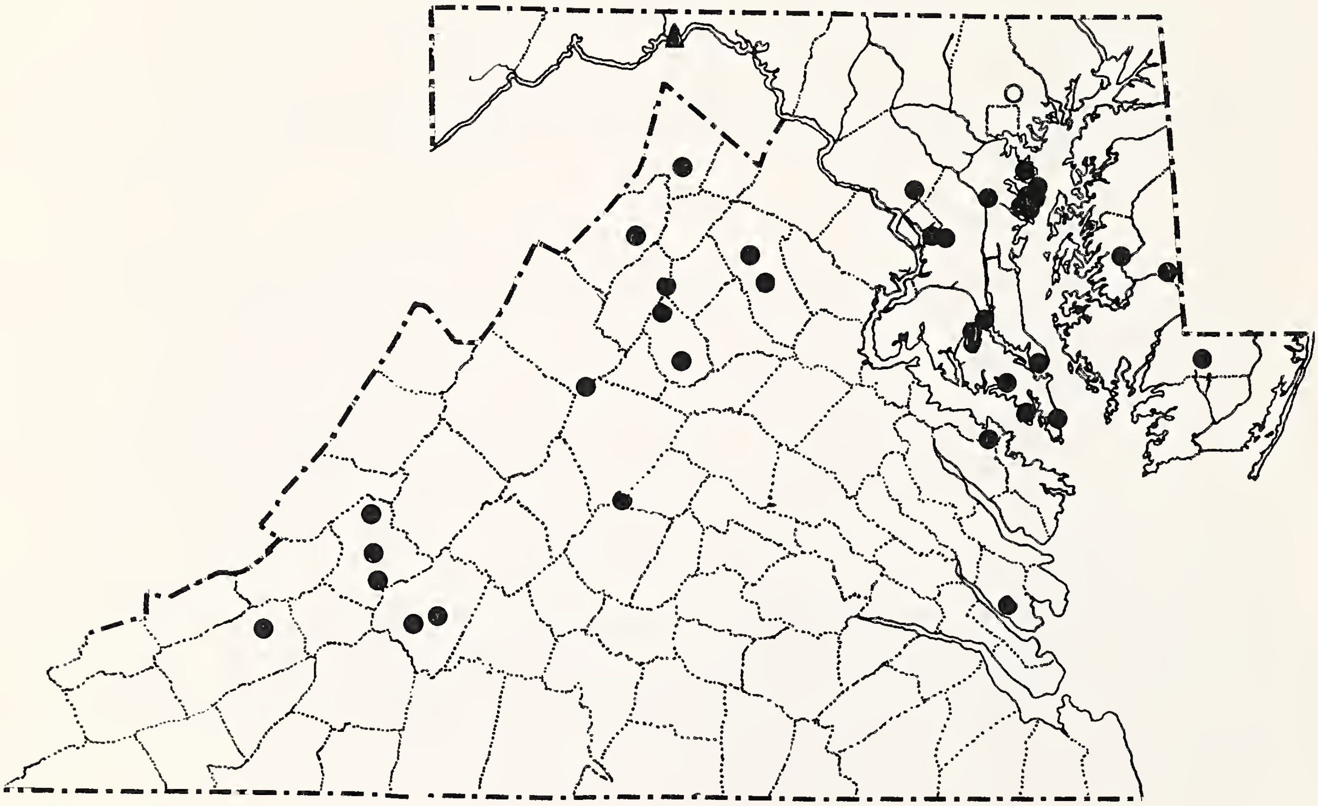

Fig. 1. Distribution of the corn snake, *Elaphe guttata guttata*, in Maryland and Virginia. The locality in Washington County, Maryland is marked with a ▲. The record from Loch Raven, Baltimore County, Maryland held questionable by Harris (1969) is marked with a ○. Virginia locality data provided by Tobey (1970) and Maryland records from Harris (1969).

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—Arnold Norden, *Dept. Herpetology, Nat. Hist. Soc. Md., 2643 N. Charles Street, Balto., Md. 21218.*

THE OCCURRENCE OF *HYLA FEMORALIS* IN MARYLAND

by

J. A. Fowler, Biology Department, The Sidwell Friends School, Washington, D. C.

and

Grace Orton, Department of Herpetology, Carnegie Museum, Pittsburgh, Pennsylvania

The pine-woods tree frog, *Hyla femoralis*, Latreille, primarily an inhabitant of the Southern and Gulf Coastal Plain, was recorded from the Dismal Swamp of

Virginia by Brady (1927). There appear to be no published records of the species north of this area. We are indebted to Dr. Norman Hartweg of the University of Michigan Museum of Zoology, who has permitted us to report on a series of four specimens (UMMZ 91960) collected along Battle Creek near Gray's Corner, southwest of Prince Frederick, Calvert County, Maryland, in 1937 by Dr. Carl L. Hubbs. This represents a considerable northward range extension, and is apparently the first record of the occurrence of *femoralis* in Maryland. All four specimens are females, two of them gravid. The snout-vent lengths range from 31 to 35 mm.

Battle Creek is a region of considerable ecological interest. It is in the Coastal Plain of southern Maryland in that part known locally as the "Western Shore" and is on a peninsula between the Chesapeake Bay on the east and the Patuxent River on the West. In its valley occurs one of the few cypress swamps in Maryland. It was from this cypress swamp that the specimens of *H. femoralis* were collected. Although the mouth of Battle Creek is an estuary, the portion in which the cypress swamp occurs is quite narrow and is at the head of tidewater. The trees in this swamp are second-growth, most of the large trees having been removed. The characteristic "knees" of the cypress are of frequent occurrence on the partly inundated floodplain of the creek.

The association of *H. femoralis* in Maryland with cypress is apparently significant. Thus the Carnegie Museum collection contains two *femoralis* (CM 19041-42) collected at Shackelford Farms, near Lanexa, New Kent County, Virginia, on August 15, 1940, by Neil D. Richmond. Both these specimens and the Battle Creek series were taken in areas where small remnants of cypress swamps have persisted and probably represent isolated populations which have survived in the north only in such limited favorable localities. In the far south, however, *femoralis* is apparently most abundant in the pine flatwoods and does not show as close association with cypress as do certain other hylids (*vide* Wright, 1932). In connection with the occurrence of *H. femoralis* in cypress swamps in the north, such swamps also exist on the Eastern Shore of Maryland and Southern Delaware and may also be inhabited by this frog.

The addition of *H. femoralis* to the amphibian fauna of Maryland is of particular interest because of two other southern species of amphibian and reptile which have been recently recorded from the state. Noble and Hassler (1936) have thus recorded *Microhyla carolinensis* from Calvert County, and McCauley (1939) has recorded *Abastor erythrogrammus* from Charles County.

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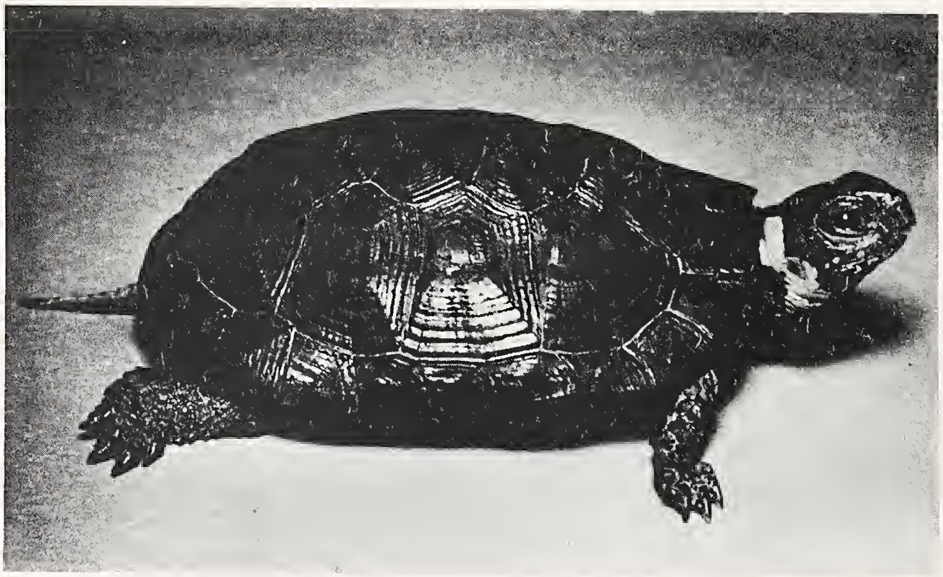
THE BOG TURTLE IN MARYLAND

by Howard W. Campbell



Clemmys muhlenburgi, the Bog Turtle. The apparently light markings on the sides of the head and neck are actually orange blotches. Photo by Robert S. Simmons.

The Bog turtle, *Clemmys muhlenbergi*, has been reported in Maryland from only a handful of specimens from three localities (Cooper, 1949; Barton and Price, 1955). Recent collections have added several localities and many specimens to the list.

Two specimens have been collected in a small roadside bog one mile SW of Eko in Baltimore County (R. S. Simmons, *pers. comm.*), and several more from Broad Creek, Harford County (J. E. Cooper, *pers. comm.*). Another colony of this turtle in northern Baltimore County has been observed for several years and a number of notes taken on their behavior. This locality is a stagnant swamp on the northeast bank of the Gunpowder Falls on the property of the Blue Mount Trap Quarry, one mile SW of Whitehall, and two miles E of Hereford.

The swamp is approximately 130 yds. long by 10 to 20 yds. wide; it is bordered on the north by the quarry and is being slowly filled in by the quarries scrap-dumping activities. To the east it is bordered by the fill of a railroad spur and a hillside, to the west by the Gunpowder Falls, and to the south by a damp meadow through which a small stream drains the swamp.

The dominant plant is Cattail, *Typha latifolia,* although this is located primarily at the southern end of the swamp. The majority of the water surface is open with very little plant growth of any kind. The water varies in depth from four to ten inches deep with a muddy bottom six inches to a foot deep. The water is usually covered with an orange scum, and occasionally by a light oil slick from the quarry. Dominant reptiles in the area are *Chrysemys p. picta, Clemmys guttata, Kinosternon s. subrubrum,* and *Natrix s. sipedon.* The most abundant amphibians are *Rana palustris. Hyla c. crucifer,* and *Bufo americanus.* Immediately across the river to the west is a small sphagnaceous bog. No Bog turtles have been found there in spite of intensive collecting.

The first Bog turtles were collected in the swamp on July 28, 1951. Between that date and May 23, 1953, 21 specimens were captured or observed. Only six specimens were actually removed from the swamp, two of these being empty shells. Nine of the remaining 15 turtles were marked by notching the marginals and released, but none was ever recaptured. The others were released without being marked.

The earliest recorded specimen was an empty shell with some flesh in a high state of putrefication, collected on April 10. On the following day a female was collected moving about in the small stream draining the swamp to the south. The greater majority of specimens were collected in the months of May and July, the latest recorded appearance being October 17.

Apparently, natural mating in this species has been reported only once. Barton and Price (1955) give the only record for mating in nature, on June 4 in Pennsylvania. Mating pairs of these turtles were observed on two occasions in the Baltimore County swamp, on May 30, 1952, and May 9, 1953. On both occasions the turtles were in water deep enough to cover the females completely and the males partially. In both instances the male had hooked his feet under the female's marginals and was observed to lean forward and make snapping motions at the female's withdrawn head.

The feeding activities of wild Bog turtles has been observed frequently. On June 10, 1952, a small male (61 mm) was collected while feeding on a dead *Rana palustris* under about four inches of water. On another occasion, May 9, 1953 a specimen was observed eating the larvae of the Baltimore butterfly, *Euphydras phaeton,* in the small meadow to the south of the swamp. These observations support the observations of Barton and Price (1955) that this species feeds with equal ease both above and below the water. Several captive specimens have voided the remains of an unidentified species of snail.

In this area the Bog turtle's main enemy seems to be the Raccoon, *Procyon lotor*, since both of the dead, empty shells found were surrounded by the tracts of this animal. Numerous shells of *Clemmys guttata*, *Kinosternon s. subrubrum*, and occasional *Chelydra serpentina* were found in the same condition.

The largest specimen collected in this area was a male measuring 97 mm. in a straight line through the carapace. The largest female measured 97 mm.

I would like to express my appreciation to Mr. John E. Cooper for bringing the Harford County record to my attention, and to Dr. Robert S. Simmons for the use of the Eko record, and for identifying the larvae of the Baltimore butterfly.

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Reprinted from *The Maryland Naturalist*, xxx (1-4): 15-16. For a current report on distribution see Bull. Md. Herp. Soc., 5(4): 97-161 and Bull. Md. Herp. Soc., 3(4): 80-96.

A MATING ANTIC OF THE LONG-TAILED SALAMANDER. -In the course of a study of the ecology of a chromite mine adit near the intersection of Falls and Old Pimlico Roads, Bare Hills, Baltimore County, Maryland, in 1955, I observed preliminary courtship activities in the long-tailed salamander, *Eurycea longicauda longicauda* Green.

The adit is a nearly straight shaft extending horizontally in a southerly direction for ca. 165 feet into a hillside. It averages 6 feet wide, tapering at the rear as a result of cave-in. It ends in a dry-floored "room" (6 x 12 feet) which is the only dry ground in the shaft. The rest is filled with water which varies from a few shallow, scattered pools in summer to better than three feet in depth in the spring. On rainy days the water inflow through the ceiling is considerable, and the inside water level obviously depends to a large extent on rainfall. At one time the epigeic stream which flows by the entrance was slightly connected to the hypogeic water. Rock fall and breakdown have raised the level of the ground at the entrance and separated the epigeic and hypogeic waters.

In the adit lives a popularion of *Eurycea l. longicauda* and *Rana palustris*, with a few *Desmognathus fuscus fuscus* and *Eurycea bislineata bislineata*, and an occasional *Pseudotriton ruber ruber*. The size of the *longicauda* population has diminished in recent years; this is due in large part to some indiscriminate collecting.

On October 18, 1955, the date of these observations, no salamanders were seen along the walls from the entrance to the 50 foot mark. Near this mark I saw and touched a *longicauda* which was on a ledge. The salamander "flipped" into the water and swam rapidly on the surface with a frantic undulating movement straight up the middle of the steam for about 10 feet, where it disappeared into a dynamite hole in the side wall. Two salamanders emerged from the hole and the original occupant moved about 12 inches down the wall to the water level while the intruder moved a short distance rearward in the shaft. The original occupant of the hole was stumptailed, as were other members of the population in the adit, and was evidently a male, with the region of the naso-labial grooves being vastly swollen and the cirri very pronounced. This salamander, having moved to the water's edge, moved immediately back to the edge of the hole, then off in the direction of the first salamander, a female. He crossed directly in front of the female and under her chin, apparently in an attempt to "head her off." He then rubbed his head around the anal region of the female, apparently attempting hedonic gland stimulation, but she moved about a foot away. The male, moving very erratically, went off in the direction of the water, alert and obviously seeking. He then moved back to the dynamite hole but did not go in. His movements were such as to bring to mind the term "spastic."

After examining the edge of the dynamite hole for awhile the male moved off quickly along the route which the female had taken. She had moved several feet from the original site and was sitting stationary. However, when the male caught up with her and his snout touched her tail, she moved off away from him headed in the direction of the water. The male followed and the female turned and headed back up the wall. Several times he made almost frantic attempts to head her off, and on one occasion his pursuit was so intent that he fell off a small face of the wall. When he finally overtook the female she stopped. He then moved in front of her so they were snout to snout. The female moved off quickly to one side, but the male immediately followed.

The observation, which had lasted 40 minutes, was then interrupted by a disturbance in the shaft. When I returned to the vicinity later I could not locate the salamanders.

Temperatures in the vicinity of the 50 foot mark in degrees Centigrade were: water 12.8°; air ca. 2 feet above water 12.5°; air at ceiling 13.4°. Relative humidity, measured with a sling psychrometer, was 94 - 100%.

Frank R. Manson records the following note in the Field Journals of the Natural History Society of Maryland. "On November 16, 1947 . . . I found 40 exceptionally large adult Long-tailed salamanders. The females were all gravid and the males had their naso-labial folds enlarged such as the Two-lined salamander (*Eurycea b. bislineata*) during the mating and breeding season."

The eggs have yet to be discovered in the Bare Hills Chrome Mine adit.

This inconclusive observation is published in the hope that it might give a clud to the mating activities of this species, the natural history of which in Maryland bears investigation. - *John E. Cooper, Department of Herpetology, Natural History Society of Maryland.*

Reprinted from *The Maryland Naturalist*, xxx (1-4): 17-19.

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R G TUCK, JR

JUN 25 1971

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JUNE 1971 VOLUME 7, NUMBER 2

Bulletin of the Maryland Herpetological Society
Volume 7 Number 2 June 1971

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The Cover: A hatchling *Trionyx s. spinifer* collected 20 Sept. 1970 near Selbysport along the Youghiogheny River by Peter Wemple. Photograph by Dr. Robert S. Simmons.

Ed. Note: Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8-1/2 by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at $.01 a page ($.02 a page with photographs) and should be ordered when manuscripts are sent in. Minimum order 100 reprints.

Correction Vol. 7 No. 1 - Photographs on pages 15, 18, and 21 were courtesy of Dr. Robert S. Simmons. Bulletin Staff, Steering Committee and Officers should have been listed as shown in this issue.

The Maryland Herpetological Society, Department of Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

BULLETIN OF THE

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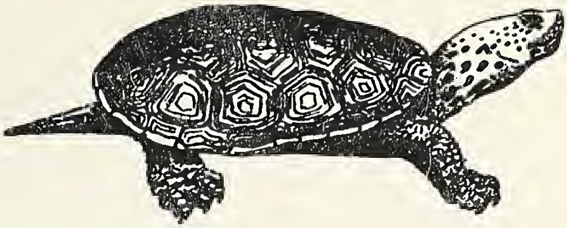

Volume 7 Number 2 June 1971

The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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THE EASTERN SPINY SOFT-SHELLED TURTLE *TRIONYX SPINIFER SPINIFER* LE SUEUR IN MARYLAND

On 20 and 26 September 1970, members of the Maryland Herpetological Society including myself collected seven hatchling eastern spiny soft-shelled turtles *Trionyx spinifer spinifer* Le Sueur from the Youghiogheny River near Selbysport, Garrett County, Maryland.

These records appear to provide the first evidence of the natural occurrence of this species in the state of Maryland. Roddy (1928) says that "It may occur in the lower Susquehanna," (which would imply Maryland) but McCauley (1945) citing this remark, states that "No specimens exist to bear this out." Carr (1952), Conant (1958) and Webb (1962) shade in the Ohio drainage of Maryland but cite no records from the state. Harris (1969) remarks that its occurrence in the Ohio drainage of Maryland is to be expected. Mansueti and Wallace (1960) report what they believe to be an introduced *T. s. spinifer* taken from the Rhode River in Anne Arundel County. They also comment that "It may have occurred naturally in the Ohio drainage system in extreme western Maryland, but mine waste pollution may have exterminated it," and that "there are no specimens extant in museums or locality records (of *T. s. spinifer*) from the Youghiogheny system of Maryland."

The locality near Selbysport has been known for several years as being a possible habitat for *Trionyx* by the Maryland Herpetological Society. Previous investigations revealed tracks which were believed to be those of soft-shelled turtles but no specimens were seen.

The visit on 20 September 1970 was included in the itinerary of an MHS field trip to Garrett County. Arriving at about 3:00 P. M. in warm dry weather we found the Youghiogheny very low. Areas of exposed wet mud along the shores indicated that the river had fallen a few inches quite recently. In these wet areas were numerous turtle tracks which with two exceptions indicated that the turtle had been buried in the mud and had emerged and crawled about two feet to the water. There were at least ten instances of this behavior and further, the tracks all exhibited plastral and tail drag, and with but one exception were uniformly about an inch and a quarter in width. The exception was a set of tracks about four inches wide of a turtle that emerged about six feet back from the edge to crawl to the water. Apparently the turtles had been buried in the shallows and had relocated after the water level dropped. This behavior and the heavy tail drag exhibited seemed appropriate for a group of hatchling soft-shelled turtles and inspired further search. Although soft-shelled turtles can be easily collected by finding irregularities in the bottom where they are buried, we were not able to see the bottom because of the turbulance created by many small fish. As an alternative we felt the bottom at random where the tracks were most numerous and, using this method, collected three *T. s. spinifer*. All were recent hatchlings and two still possessed egg teeth.

On 26 September 1970 I returned to the area seeking additional specimens. I arrived at about 1:00 A. M. after a cold front with heavy thunderstorms had passed through. Deciding to check for nocturnal activity in *Trionyx*, I found the shallows very clear. A sharp edged hole about one half inch in diameter under about three inches of water attracted my attention. A little probing of this hole, produced a hatchling *T. s. spinifer*. The next day (12:00 noon) I found another hatchling under a mound of recently disturbed mud at about the same depth. Two additional hatchlings were taken by the random search method on the east side of the river. (All of the others had been taken from the west shore). The weather during the second visit was cool, cloudy with a slight drizzle. With the exception of two snapping turtles *Chelydra serpentina serpentina* Linne no other herpetofauna were observed in the immediate vicinity on either trip.

There was much evidence that the habitat where these turtles were collected can undergo considerable change during the year. The Youghiogheny River joins the Youghiogheny Reservior at this locality, and denuded reservior bottom was evident on both sides extending back several hundred feet. Watermarks, not to mention stranded boats and a diving float, indicated that the water could rise at least fifteen additional feet. At such times the habitat would be properly the reservior and not fluviatile.

We found the river to be about three feet deep at midstream, approximately two hundred feet wide, slightly silty, with a rock bottom but with muddy areas close to shore. In deep water there was enough current to make wading difficult. The only aquatic vegetation observed was blue green algae located in a shallow bay, protected by a sand bar on the east shore. This bay contained two of the *spinifer* collected, patches of sludge worms (*Tubifex*), a five inch snapping turtle and many small catfish. Crayfish were numerous throughout the habitat.

The seven specimens taken, all hatchlings with either egg tooth scars or egg teeth, and the numerous examples of tracks which I believe to have been made by these turtles indicate that at least one clutch of *T. s. spinifer* had recently hatched in the area. Webb's (*loc. cit.*) locality records to the immediate north in Pennsylvania and the ideal habitat for the species lend further evidence that there is a breeding colony of *T. s. spinifer* in the Youghiogheny at Selbysport, Maryland.

Four specimens are presently preserved in collections. Two (R1727NHSM and R1732NHSM) are at the Natural History Society of Maryland in Baltimore, and two others (167734A and 167734B) are at the Smithsonian Institution in Washington, D.C.

Based on Webb (1962), I can find no reason precluding the occurrence of the smooth soft-shelled turtle *Trionyx muticus muticus* Le Sueur in the Ohio drainage rivers of Maryland. All soft-shelled turtles seen in this area should be checked closely to ascertain if this species is also present.

I wish to thank Herbert S. Harris, Jr., David S. Lee, Daniel J. Lyons and Arnold W. Norden, who pointed out the locality and reported evidence of *Trionyx*; Jeremy Jacobs who assisted me by capturing one of the specimens; and Robert G. Tuck who braved a flat tire on the way to the locality on the first trip and assisted me by providing literature and advice related to this manuscript. All are members of the Natural History Society of Maryland.

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——Peter Wemple, *3352 Chillum Rd., Mt. Rainier, Maryland. 20288.*

AN ADDITIONAL SPECIMEN OF THE SCARLET SNAKE, *CEMOPHORA COCCINEA*, FROM THE NEW JERSEY PINE BARRENS

The existance of *Cemophora* in New Jersey was suggested by Fowler (1908) and later authenticated by Kauffeld (1935) who reported the scarlet snake from Burlington County. Subsequently Kauffeld & Trapido (1944) and Williams and Wilson (1967) reported specimens from widely scattered locations in the southern portion of the State. Conant (pers. comm.) indicates the presence of *Cemophora coccinea* in Atlantic, Burlington, Camden, Cumberland and Gloucester Counties.

At 4:30 p.m. on 19 July 1969, D. Hulmes, W. Jewel and the author collected an adult *Cemophora coccinea* 3/4 mi. southwest of Friendship Road, in the vicinity of the Carraza Memorial, Burlington County, New Jersey. The specimen was found inside a damp decaying railroad tie along the New Jersey Central Railroad Line. The 44.9 cm female was typical of the species.

The surrounding area is characterized by loosely packed, well drained sand. Vegetation consists of a canopy of low pitch pine (Pinus rigida) mixed with scattered black jack oak (Quercus marilandica). The undergrowth is primarily scrub oak (Quercus ilicifolia) with early bush blueberry (Vaccinium vacillans) and blackberry (Rubus allegheniensis) in evidence.

The specimen (A.M.N.H.106683) has been deposited in the American Museum of Natural History.

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—Robert L. Brandner, *Department of Herpetology, New York Zoological Society, Bronx, New York. 10460.*

AN ADDITIONAL CASE OF ABNORMAL PIGMENTATION IN A MARYLAND REPTILE

On 20 September 1970, Boyd L. Shoemaker collected an albinistic *Thamnophis sirtalis sirtalis* Linnaeus near 111 Summit Hall Rd., Gaithersburg, Montgomery County, Maryland.

The snake has a total length of 310 mm. (snout-vent length 240 mm.) and a weight of 75 grams. The general dorsal scale coloration is pale yellow-white with the skin between the scales being translucent. The three longitudinal stripes are a slightly clearer yellow. A checkerboard pattern is visible in the areas between dorsal and lateral stripes, the darker scales being dull red washed (posterior part of scale) with pale yellow, and the lighter scales being pale yellow-white. The venter is solid yellow-white. Red pigment is strong and "natural looking" in lines at the sutures of the labials. There are also two dark blotches at the back of the head where red pigment is very obvious. The pupil is brilliant red, surrounded by a gold (top 1/3) and red (bottom 2/3) iris. The tongue is also brilliant red.

Judging by the definitions of albinism given by Harris (June, 1970), I would suggest that this specimen is a xanthic and erythric partial albino. The specimen was donated to the National Zoo, Washington, D.C. where it is presently thriving. It has not received an accession number as of this date (5 November 1970), but is identified on record as simply, "Albino".

Literature Cited

Harris, Herbert S., Jr. 1970.
Abnormal pigmentation in Maryland amphibians and reptiles. Bull. Md. Herp. Soc., _6_ (2):21-27.

——Thomas Keefer, *Keeper, Reptile Division, National Zoological Park, Smithsonian Institution, Washington, D.C.*

A NOTE ON THE FEEDING BEHAVIOR OF THE SQUIRREL TREE FROG, *HYLA SQUIRELLA*

Recently, Reid and Nichols (1970) record a turtle (*Clemmys insculpta*) and a snake (*Agkistrodon c. mokasen*) adjusting their feeding behavior to take advantage of the temporary abundance of nymphs of the seventeen-year cicada, a food item not normally available to them. This note describes a somewhat similar situation concerning the squirrel tree frog, *Hyla squirella.*

During the years 1965-1966 I made observations on the various species of amphibians occuring in the area of my home in Marrero, Louisianna. One of the most common species present in this area during the time of my residence was *Hyla squirella*, and specimens could often be found by day in the foliage around the house or clinging to the windows or moving about the lawn at night. At the rear of our fenced in yard several refuse recepticles were kept, the contents of which were removed at regular intervals. After these collections were made the lids of the normally tightly closed containers were left off and flies gathered in the area in considerable numbers. At these times *Hyla squirella* would converge on the area of the recepticles and avidly feed on the flies that were present. At other times these frogs could not be found around the refuse can area in any notable numbers and were never noted to feed during the daylight hours, when these observations were made. It is interesting to note that while other species of frogs were often observed in the area, they were never observed taking advantage of this temporary abundance of food.

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Predation by Reptiles on the Periodic Cicada. Bull. Maryland Herp. Soc. 6 (3):57.

—— Scott Hallinger, *1703 Woodbound Ave, Baltimore, Maryland.*

A FEEDING OBSERVATION ON THE RAINBOW SNAKE (*FARANCIA ERYTROGRAMMA ERYTROGRAMMA*)

On 28 July 1970 at 7:15 p.m. CDST (about 30 minutes before sunset), a 38 inch Rainbow Snake (*Farancia erytrogramma erytrogramma*) was observed backing out of the water at Blackwater Bay, 25 miles N. of Pensacola, Florida. It was struggling with a 14 inch eel (Anguilla) that it had grasped by the tail. The eel was dragged away from the water to a small jetty of bricks and cement blocks where it was swallowed. During the swallowing process the *Farancia* thrust its tail into the brick pile, apparently to gain support.

The snake appeared unconcerned by the presence of several persons who stood nearby as it was feeding. When the sides of the snake were touched, and objects passed near his eyes no reaction was apparent. After the eel was swallowed the snake forced his head between two bricks and started crawling, which appeared to help force the eel further down his gullet. The snake then held it's head up, looked around, thrust out it's tongue several times, and crawled directly into the water. The entire process required approximately 1 hour.

Blackwater Bay is brackish, with about an 18 inch tide (this observation occured at low tide): and crabs, sting ray and barnicles abound. There is quite a lot of eel grass growing approximately ten feet below the low tide line.

—— Albert P. Metrolis, *Route 4, Box 202, Milton, Florida, 32570.*

NOTES ON HATCHLING MOLE SNAKES, *LAMPROPELTIS CALLIGASTER RHOMBOMACULATA* HOLBROOK, IN MARYLAND

Since little is known about the reproductive habits of *Lampropeltis calligaster rhombomaculata*, the following data may be worthy of note.

On 27 August 1966 a farmer while plowing a field uncovered a group of nine hatchling *L. c. rhombomaculata*, 2 mi. E. of Dorsey, Anne Arundel County, Maryland. These snakes were given to Heru Ra Walmsley who in turn gave them to us. When the snakes were received, the egg teeth were still present. The specimens shed after a few days in captivity and the egg teeth were lost at this time. One snake ate mealworms and sow bugs and shed once more before the approach of winter. Of the nine, three were released, two were given to George Lakich, two are in the collection of Clyde Prince, and two are in the vertebrate collection at Brigham Young University, (BYU 21857 and 30535).

Although all were not measured, they were approximately 225 mm in total length. Considering the presence of egg teeth and the fact that dispersal had not occured, we can speculate that hatching occurs in Maryland toward the end of August.

Only one other instance of egg laying by *Lampropeltis c. rhombomaculata* is known to the authors (Howden, 1946). He records a 41 inch specimen that layed 15 eggs on 11 July 1936. At least nine eggs were present in the clutch reported here, however, some hatchlings may have dispersed prior to collecting. Egg shell fragments were not noted by the collector.

We are indebted to Wilmer W. Tanner for reviewing and criticising the manuscript.

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——William L. Grogan, Jr., *Brigham Young University, Provo, Utah (present address 532 Prince Charles Ave. Odenton, Md.) and E. Clyde Prince, 285 Carter Lane, Millersville, Maryland.*

OBSERVATIONS ON THE NESTING OF *CLEMMYS MUHLENBERGI* IN A SIMULATED ENVIRONMENT

During May 1970, four gravid female bog turtles were collected from three different localities in Morris County, New Jersey and Lancaster County, Pennsylvania. (The eggs can be palpated by slipping the little finger into the soft tissue of the inguinal region in an antero-medial direction.) No turtles were removed from any colony in which fewer than five specimens were observed, and the ones collected were returned to their respective colonies after laying their eggs.

These turtles were kept in an enclosure two feet by one and one-half feet with six inches of rich soil mixed with leaf mold as a substrate. Plastic plants were used sparingly to simulate the natural environment. A glass pie plate, nine inches in diameter and one and one-half inches deep, was recessed into the soil at one end of the terrarium to serve as a pool. The turtles kept this pool constantly muddy by their incessant clambering in and out. They seemed to thoroughly enjoy sitting half-submerged in the resulting mud. This arrangment was kept indoors and placed in a room in which it received direct sunlight for one hour in the morning and for one and one-half hours in the late afternoon. No effort was made to control the day length. Artificial lights were used intermittently in the room, although their enclosure was not purposely exposed to these lights.

It is of interest, that all four turtles chose to lay their eggs between 12:00 mid-night and 5:30 a.m. and that three of them picked the same spot in which to lay. This was the corner of the enclosure which was struck by the late afternoon sun The fourth specimen laid her eggs in the water dish full of mud. Following are brief summaries of the observations made at each nesting:

10 June 1970. First nest constructed by a 95 mm. specimen from Penna. Depth of nest was 62 mm. and it was covered by a slight mound of packed soil surrounded by a circular trench 10 mm. in depth. The first egg laid was 36 mm. x 13 mm. and the last three were 32 mm. x 13 mm.

18 June 1970. Second nest, 51 mm. deep, dug by an 82 mm. Penna. specimen. The eggs were incompletely buried, the top egg being visible. This egg had a longitudinal crease which disappeared in 36 hours. The first three eggs laid measured 36 mm. x 13 mm., the last one, 32 mm. x 13 mm.

29 June 1970. The third nest, 37 mm. deep, was constructed by a 92 mm. turtle from New Jersey. The eggs were covered with a minimum of soil and were spread out more in the nest than those in the first two instances which were laid more or less one atop another. Egg measurements showed the first egg to be 29 mm. x 15 mm., the second 31 mm. x 14 mm.,

and the last two 28 mm. x 15 mm.

30 June and 2 July 1970. On these two dates an 38 mm. New Jersey *muhlenbergi* laid single eggs in the water dish which was filled with mud. This female was the most careless of the four. She excavated very briefly in the mud, then laid an egg on both occasions; no effort was made to cover either egg, and immediately after laying she climbed out of the dish and walked about. The first egg, 32 mm. x 15 mm., had a longitudinal crease in it which disappeared in 48 hours. The second egg measured 33 mm. x 15 mm. No other eggs were palpable, so the specimen was released on 5 July 1970. This female had a crack in the carapace which extended from the right first marginal into the fourth central, traveling just to the right of the mid-line. The injury was open, but epithelialization had occurred at the level of the soft tissue. This injury may have been responsible for the poor attempts at nesting and the fact that only two eggs were laid. The turtle was able to function quite adequately otherwise.

The eggs were collected the morning after laying and incubated in dampened sphagnum moss (a commercially prepared dried product). The temperature in the container ranged from 80° at night to 96° F. during the day. Six of the eggs were infertile and failed to show any signs of development. Those which did contain embryos remained fairly constant in length throughout their development but their diameters increased to 20-25 mm. just prior to hatching. Those eggs which did hatch (8) represented incubation periods of 43 to 47 days.

Early researchers, Reed and Wright (1909), Wright (1918), and Barton and Price (1955). mention three eggs as the only observed clutch size. Barton and Price (*loc. cit*) remark that "every clutch on record from any observer numbers three eggs". Nemuras (1967) reported finding a clutch of four eggs in a terrarium containing a pair of bog turtles. Eglis (1967) relates that Mildred Alexanderson, a successful breeder of *C. muhlenbergi* for some years, has found 60% of her clutches contained five eggs, 30% had four, and only 10% had three eggs. If these more recent observations indicate a real increase rather then an apparent increase in the number of eggs per clutch in *Clemmys muhlenbergi* since data reported by Barton and Price (1955) perhaps this is a natural attempt at preservation of an endangered species through the production of a larger number of offspring.

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——William H. Zovickian, *54 Babybird Court, Baltimore, Maryland, 21227.*

THE RATTLESNAKE, *CROTALUS HORRIDUS* IN THE MARYLAND PIEDMONT

Crotalus horridus horridus (Linnaeus) has been recorded previously in Maryland only from the mountainous sectors of Frederick, Washington, Allegany and Garrett Counties, in the major physiographic region known as the Appalachian Province, encompassing the minor provinces of the Alleghany Plateau, the Alleghany Ridges, the Cumberland Valley and the Blue Ridge (McCauley, 1945, *Reptiles of Maryland and the District of Columbia,* pub. by author, 135-8). On the basis of information we have been gathering for the last ten years, it can now be reported from two localities in the Piedmont Plateau.

On July 11, 1948, our attention was called to two photographs of a large specimen of *horridus* on the wall of the game warden's cabin at the Loch Raven reservoir, Baltimore Co. The warden, Mr. Baker, informed us that the photos were taken in 1946 at the Prettyboy Dam in NW Baltimore Co. This area is in the eastern division of the Piedmont, about 3 miles from the Carroll County border and 4 or 5 miles from the

Maryland-Pennsylvania state line. It had been found among rocks on the shore at the base of the dam. It measured approximately 46 inches, somewhat larger than McCauley's 978 mm. maximum for the state (*loc. cit.*, 137). Warden Baker had observed two additional rattlers, both in April, 1948, in the same place.

This was the first acceptable record for *horridus* in the Piedmont of Maryland, and the first record for Baltimore County. Since then, other interesting records from the Prettyboy area have come to light. In 1954, M. E. M. Brown of Reisterstown, Baltimore Co., informed us that he knew of several rattlers that had been taken at the dam site in the three or four years prior to 1954. In July 1954 a snake which had been killed near the dam was brought to the Baltimore Zoo. The collector talked with and showed the snake to Officer Sherman Pruitt of the Park Police, an amateur naturalist, who identified it as *horridus*, but apparently failed to realize its interest from this locality. On June 20, 1955, we examined the skin of a specimen that had been killed in 1932 on the Baltimore Co. property of Nita K. Schamberger. The skin was of a yellow phase rattler about 3 feet long. Many other substantiating observations have been reported to us. According to the caretaker of the dam area, the majority of rattler reports come from along the Spooks Hill Road and the Prettyboy Dam Road about 2 miles above the dam. The land on both sides of the road is open farmland, but on one side there is a dense woods which runs downhill to the Prettyboy reservoir. There is no doubt that the timber rattlesnake is a rather common snake in this area, as is *Ancistrodon contortrix mokeson*.

The other Piedmont locality from which *horridus* is now known is perhaps more interesting than the first, since it lies just north of Towson, a suburb of Baltimore City. A large female rattler was collected at Overshot Run, which enters the north shore of Loch Raven reservoir not far from Sunnybrook, Baltimore Co., in the summer of 1952 by Mr. T. S. Fitchett, Jr.. It was donated to the Baltimore Zoo on August 11, 1952, where the identification was verified by zoo employees and by Mr. Ron Nowakowski, an amateur herpetologist of Baltimore. While at the Reptile House this snake gave birth to several young (number unknown). Unfortunately the female and young were disposed of and cannot be traced.

Loch Raven and Prettyboy are water-supply reservoirs on the Gunpowder Falls; the latter site is about 12 mi. NW of Loch Raven, which is about 5 or 6 mi. N. of Towson and about 10 mi. from the Baltimore City limits. The nearest previously known Maryland locality was near Thurmont, Frederick County, in the Blue Ridge. There is a hiatus in the distribution of *horridus* through Carroll County, but the species might turn up there after more extensive collecting. The Baltimore County sites may represent relict populations, cut off by human agencies in recent times, since there is evidence that *horridus* was once considerably more widespread in Maryland than at present (McCauley, *op. cit.;* and Warden, 1820, *Description statistique, historique et politique des Etats-Unis de L'Amerique septentrionale* . . . Paris, Chez Rey et Gravier).

McCauley predicted the occurrence of *horridus* in the Piedmont, saying (*op. cit.*), "It may also occur in the more rugged areas near the northern boundary of Maryland as far east as Harford or Cecil County." As the Loch Raven record has proved, it may also occur in suitable rugged areas somewhat south of the northern boundary. Mr. Fitchett has informed us that he has seen rattlers at a quarry near Texas, Baltimore Co., and Mr. Harry Edel, of Baltimore, has told us of rattlers from "Rocks," Harford County.

A specimen of *horridus*, slightly under four feet in length, was collected near the southern end of Kent Island in Queen Anne's Co. by Mr. Edward C. Bradley of Glen Burnie, Maryland. It was captured during July, 1958, in a dry, sandy pine woods. It was sold to Mr. Heru Walmsley, also of Glen Burnie, who now has it alive in his private collection where we were permitted to examine it.

Kent Island lies in the Chesapeake Bay just off the mainland of the Eastern Shore of Maryland, from which it is separated by a narrow tract of shallow, swampy waters of insufficient depth and extent to constitute a faunal barrier, hence the island can be regarded as mainland. It lies within the dry, sandy and flat Outer Coastal Plain, in an area of extensive cultivation.

In view of the fact that the above specimen was collected in a region far out of its known range and habitat in this state, it may well not be a record of natural occurrence. However, rattlers are known to occur in similar situations in southern New Jersey, and the Eastern Shore has been less extensively collected than most other parts of Maryland.

——John E. Cooper, *Department of Herpetology, Natural History Society of Maryland and Baltimore City College, and Frank Groves, Baltimore Zoo, Baltimore 17, Maryland.*

Reprinted from *Herpetologica* 15 (1):33-34. Ed. Note: Since the publication of this paper in 1959 it has been established that the specimen supposedly collected near the southern end of Kent Island in Queen Anne's County was actually collected in Pennsylvania well into its known range.

Natural History Society of Maryland
Maryland Herpetological Society

R G TUCK, JR
OCT 1 1971

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Amphibians and Reptiles from Iran in the United States National Museum Collection

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CORRIGENDA

page 48, line 28: for Clark, and Anderson (1966) read Clark, Clark, and Anderson (1966)
page 48, line 37: for Tuck, 1970 read Tuck, 1971
page 55, line 8: for (Blanford, 1874 read (Blanford, 1874)
page 55, line 12: for (Nordmann, 1840 read (Nordmann, 1840)
page 55, line 19: for (USNM 154489-90 read (USNM 154489-90)
page 62, line 21: for *Pelamydrus* read *Pelamis*
page 64, line 21: for 5- read - 5
page 68, map 1: for Tuck, in press read Tuck, 1971
page 78, map 21: for *Elaphe longissimus* read *Elaphe longissima*
page 79, map 22: for *Pelamydrus platurus* read *Pelamis platurus*

AMPHIBIANS AND REPTILES FROM IRAN IN THE UNITED STATES NATIONAL MUSEUM COLLECTION

Robert G. Tuck, Jr.

Iran (Map 1) encompasses an area of about 1,650,000 sq. km. and is the most geographically complex nation in Southwest Asia (Anderson, 1968: 366). Thirteen major physiographic features are present (Map 3). Although much of Iran consists of a plateau some 1200 m. above sea level, altitude ranges from -28.6 m. at the Caspian Sea to 6200 m. at the summit of Mt. Demavand in the Alborz Range. Iranian plant communities vary from mesic to xeric, and most are characteristic of arid to semi-arid conditions (Map 4). The Iranian fauna includes approximately 180 described species of amphibians and reptiles of 66 genera and is composed of representatives of five zoogeographic elements: Aralo-Caspian, Iranian, Mediterranean, Saharo-Sindian, and Oriental (Anderson, 1963, 1966b, 1968). All but the last are considered regions within the Palearctic realm.

The United States National Museum of Natural History collection of amphibians and reptiles contains 951 specimens from Iran, of which 924 were obtained from August 1962 through August 1965 during field work directed by H. W. Setzer under U. S. Army Medical Research and Development Command, Office of the Surgeon General Grant Number DA-MD-49-193-63-G74(645-M). The first year's collection was assembled by G. L. Ranck and L. H. Hermann, and the specimens secured the following two years were taken by J. W. Neal, Jr., and myself.

This paper is a preliminary listing of the specimens included in the collection. Simple maps are used to indicate the general area from which each was obtained. The figures were made from color transparencies taken by myself. Certain specimens from this assemblage have been previously reported upon by Anderson and Leviton (1966b), Minton, Anderson, and Anderson (1970), and Tuck (1971).

Other recent papers based on herpetological collections made in Iran and adjacent areas have been published by Anderson (1963, 1968), Anderson and Leviton (1966a), CLARK, Clark, and Anderson (1966), Guibé (1966), Haas and Werner (1969), Latifi, Hoge, and Eliazan (1966), Mertens (1969), Minton (1966), and Schmidtler and Schmidtler (1969).

Initial identifications of the USNM Iranian specimens were made by reference to Khalaf (1959), Marx (1968), Nikolsky (1962, 1963, 1964), and Terent'ev and Chernov (1965). Many of these tentative assignments to taxa were confirmed or corrected by S. C. Anderson, M. Latifi, A. R. Hoge, and Y. L. Werner. Nonetheless, I am solely responsible for any misidentifications and errors that may appear herein.

This collection lacks Iranian salamanders but is notable for its inclusion of the only known examples of the dwarf gecko *Tropiocolotes helenae* (Nikolsky) (see Minton, Anderson, and Anderson, 1970, and Tuck, 1970) and the eighth reported specimen of the colubrid snake *Spalerosophis microlepis* Jan *in* De Filippi (see Marx, 1959).

Nomenclature used in this report is in accordance with the most recently published works (see above), but, in the instance of disagreements, I have arbitrarily made a choice. Recent Russian workers (e.g., Terent'ev and Chernov, 1965, and Shcherbak, 1966) assign the short-legged form of the frog *Rana ridibunda* in Iran to the taxon *R. r. saharica* Boulenger *in* Hartert, 1913, but, if this subspecies is valid, it should be known as *R. r. susana* Boulenger, 1905. The use of a trinomial for *Agama blanfordi* Anderson (1966a) is justified by the recent description of *A. persica fieldi* (=*A. blanfordi fieldi*) Haas and Werner (1969). *Agama agilis (sensu lato)*, as used in this paper, includes the nominal forms *A. isolepis* Boulenger and *A. sanguinolenta* (Pallas), since the confused systematics of this difficult group is currently under study by S. C. Anderson (pers. comm.).

I wish to acknowledge my great debt to S. C. Anderson for his constant and considerable aid and encouragement, and I wish to pay special tribute to the late D. M. Cochran for her consideration and many kindnesses. I am also much in debt to W. C. A. Bokermann, J. Buskirk, S. M. Campden-Main, R. I. Crombie, R. Donoso-Barros, J. Eiselt, T. J. Feuerbach, A. R. Hoge, M. Latifi, J. W. Neal, Jr., G. A. Niehaus, B. R. Orejas-Miranda, J. A. Peters, M. H. Pettibone, D. A. Schlitter, J. F. Schmidtler, H. W. Setzer, J. Vasserot, Y. L. Werner, G. R. Zug, and the Iran National Tourist Organization.

In the section that follows, collecting stations are numbered approximately chronologically in Table 1 and keyed to Map 5. In many instances a single dot on the map indicates a number of collecting stations, since on the scale used it would not be possible clearly to differentiate very close localities. Place names are given as spelled by the United States Board on Geographic Names (1956). Latitude and longitude are also taken from this work and refer only to the town or city from which the distance is measured. Taxa are arranged alphabetically, except that orders and suborders are placed phylogenetically. Each trivial name is provided with its author's name and date of publication to facilitate comparison with the usage of other workers. Familial allocations of the snakes are according to the suggestions of Underwood (1967). Abbreviations used: CAS -- California Academy of Sciences; USNM -- United States National Museum of Natural History.

CLASS AMPHIBIA

Order Salientia

Family Bufonidae

Bufo olivaceus Blanford, 1874

Faunal Element: Oriental

Collecting Stations (Map 6): 26 (USNM 148637-40); 27 (USNM 148641-43).

Total - 7 specimens.

Bufo surdus luristanicus Schmidt, 1952

Faunal Element: Iranian

Collecting Station (Map 6): 68 (USNM 153444). Total - 1 specimen.

Bufo viridis arabicus Heyden, 1827 (Fig. 1)

Faunal Element: Saharo-Sindian

Collecting Stations (Map 6): 10 (USNM 148572-76); 12 (USNM 153822); 24 (USNM 148612); 45 (USNM 149408); 54 (USNM 149423); 62 (USNM 153436-42); 66 (USNM 153443); 68 (USNM 153445); 69 (USNM 153446-47); 70 (USNM 153469-83); 71 (USNM 153528-35); 74 (USNM 153544-45); 75 (USNM 153546-50); 83 (USNM 154420-21); 84 (USNM 158427-29); 89 (USNM 154244-309, 158430); 91 (USNM 154343-44); 93 (USNM 154412-13); 94 (USNM 154345-411); 103 (USNM 158463-64); 106 (USNM 158433); 107 (USNM 158434). Total - 197 specimens.

Family Hylidae

Hyla arborea savignyi Audouin, 1827

Faunal Element: Mediterranean

Collecting Stations (Map 7): 69 (USNM 153448); 70 (USNM 153484-85); 71 (USNM 153536-40); 83 (USNM 154422); 95 (USNM 158432); 102 (USNM 158449); 103 (USNM 158465); 112 (USNM 158944). Total - 13 specimens.

Family Pelobatidae

Pelobates syriacus boettgeri Mertens, 1923

Faunal Element: Mediterranean

Collecting Stations (Map 7): 88 (USNM 154414-19); 89 (USNM 154310). Total - 7 specimens.

Family Ranidae

Rana camerani Boulenger, 1886

Faunal Element: Mediterranean

Collecting Station (Map 8): 83 (USNM 154423, 154425). Total - 2 specimens.

Rana cyanophlyctis Schneider, 1799

Faunal Element: Oriental

Collecting Stations (Map 8): 27 (USNM 148644-45); 28 (USNM 148665-67). Total - 5 specimens.

Rana ridibunda ridibunda Pallas, 1771

Faunal Element: Mediterranean

Collecting Stations (Map 8): 13 (USNM 153821); 14 (USNM 153820); 40

(USNM 149395-98); 47 (USNM 149409); 55 (USNM 149432-34); 80 (USNM 154445); 89 (USNM 154311-41, 158431, 158933-34); 92 (USNM 154342). Total - 46 specimens.

Rana ridibunda susana Boulenger, 1905

Faunal Element: Saharo-Sindian

Collecting Stations (Map 8): 3 (USNM 26192-93); 69 (USNM 153449-68, 153510-27); 70 (USNM 153486-509); 71 (USNM 153541-43); 75 (USNM 153551-61); 83 (USNM 154424, 154426); 84 (USNM 154430-44); 105 (USNM 158458); 112 (USNM 158935-43). Total - 105 specimens.

CLASS REPTILIA

Order Chelonia

Family Emydidae

Emys orbicularis (Linnaeus, 1758)

Faunal Element: Mediterranean

Collecting Stations (Map 9): 87 (USNM 154513); 89 (USNM 154506-10); 90 (USNM 154411-12). Total - 8 specimens.

Mauremys caspica caspica (Gmelin, 1774)

Faunal Element: Mediterranean

Collecting Stations (Map 9): 71 (USNM 153752); 89 (USNM 154504-05); 103 (USNM 158530-34); 104 (USNM 158529); 112 (USNM 158945). Total - 10 specimens.

Family Testudinidae

Testudo graeca ibera Pallas, 1814

Faunal Element: Mediterranean

Collecting Stations (Map 9): 72 (USNM 153753); 73 (USNM 153754); 88 (USNM 154514); 102 (USNM 158457); 103 (USNM 158528). Total - 5 specimens.

Testudo zarudnyi Nikolsky, 1896 (Fig. 2)

Faunal Element: Iranian

Collecting Stations (Map 9): 85 (USNM 154515). Total - 1 specimen.

Order Squamata

Suborder Sauria

Family Agamidae

Agama agilis Olivier, 1807 [*sensu lato*]

Faunal Element: Saharo-Sindian

Collecting Stations (Map 10): 7 (USNM 148571); 11 (USNM 148578); 12 (USNM 148586); 21 (USNM 148615); 44 (USNM 149399, 149403-05); 49 (USNM 149416-17); 54 (USNM 149418-22); 78 (USNM 153563-65); 80 (USNM 154485). Total - 19 specimens.

Agama blanfordi blanfordi Anderson, 1966

Faunal Element: Saharo-Sindian

Collecting Stations (Map 10): 34 (USNM 149145-48); 35 (USNM 149149-51); 69 (USNM 153685); 70 (USNM 153601-03); 76 (USNM 153579-81). Total - 14 specimens.

Agama caucasica (Eichwald, 1831)

Faunal Element: Iranian

Collecting Stations (Map 11): 12 (USNM 148587); 14 (USNM 153818-19); 15 (USNM 153817); 40 (USNM 149391-92); 57 (USNM 149442-43); 82 (USNM 154491-94). Total - 12 specimens.

Agama nupta De Filippi, 1843 (Figs. 3 & 4)

Faunal Element: Iranian

Collecting Stations (Map 11): 66 (USNM 153675-82, 153711-24); 68 (USNM 153739); 71 (USNM 153598); 74 (USNM 153732); 85 (USNM 154481); 110 (USNM 158438). Total - 27 specimens.

Agama ruderata ruderata Olivier, 1807

Faunal Element: Saharo-Sindian

Collecting Stations (Map 10): 71 (USNM 153600); 84 (USNM 154479); 102 (USNM 159342, 164185); 109 (USNM 164822-23). Total - 6 specimens.

Phrynocephalus helioscopus (Pallas, 1771)

Faunal Element: Aralo-Caspian

Collecting Stations (Map 12): 53 (USNM 149415); 101 (USNM 164821). Total - 2 specimens.

Phrynocephalus scutellatus (Olivier, 1807) (Fig. 5)

Faunal Element: Iranian

Collecting Stations (Map 12): 1 (USNM 69902); 8 (USNM 148579-80); 12 (USNM 148588); 16 (USNM 148593); 18 (USNM 148596-98, 148603-04);

19 (USNM 148599-602); 20 (USNM 148616-19, 148621-22); 22 (USNM 148620); 23 (USNM 148609-11); 25 (USNM 148632-36); 29 (USNM 148669-71); 31 (USNM 148672); 32 (USNM 149142); 33 (USNM 149141); 36 (USNM 149153); 64 (USNM 153586-87); 65 (USNM 153596-97); 76 (USNM 153582-85); 97 (USNM 158512-26); 98 (USNM 159343-57); 99 (USNM 158439-44); 100 (USNM 158435); 101 (USNM 153426). Total - 82 specimens.

Uromastyx loricatus (Blanford, 1874)

Faunal Element: Saharo-Sindian

Collecting Station (Map 12): 71 (USNM 153599). Total - 1 specimen.

Family Anguidae

Anguis fragilis colchicus (Nordmann, 1840)

Faunal Element: Aralo-Caspian

Collecting Stations (Map 17): 48 (USNM 149400); 56 (USNM 149441). Total - 2 specimens.

Ophisaurus apodus (Pallas, 1775) (Fig. 6)

Faunal Element: Mediterranean

Collecting Stations (Map 17): 40 (USNM 149393); 41 (USNM 149410); 81 (USNM 154487-88); 82 (USNM 154489-90). Total - 6 specimens.

Family Gekkonidae

Agamura persica (Duméril, 1856)

Faunal Element: Iranian

Collecting Station (Map 18): 12 (USNM 148585); 16 (USNM 148590-92). Total - 4 specimens.

Bunopus tuberculatus Blanford, 1874

Faunal Element: Saharo-Sindian

Collecting Stations (Map 18): 8 (USNM 148577); 26 (USNM 148647-51, 153823-32); 30 (USNM 148668); 38 (USNM 149156-57). Total - 19 specimens.

Cyrtodactylus caspius (Eichwald, 1831)

Faunal Element: Iranian

Collecting Stations (Map 18): 4 (USNM 58979); 79 (USNM 154484). Total - 2 specimens.

Cyrtodactylus scaber (Heyden, 1827)

Faunal Element: Saharo-Sindian

Collecting Station (Map 18): 26 (USNM 148647). Total - 1 specimen.

Eublepharis angramainyu Anderson & Leviton, 1966

Faunal Element: Iranian

Collecting Station (Map 18): 59 (USNM 157373). Total - 1 specimen.

Hemidactylus turcicus (Linnaeus, 1758)

Faunal Element: Saharo-Sindian

Collecting Station (Map 18): 26 (USNM 148452-55). Total - 4 specimens.

Pristurus rupestris iranicus Schmidt, 1952

Faunal Element: Saharo-Sindian

Collecting Station (Map 18): 26 (USNM 148646). Total - 1 specimen.

Teratoscincus bedriagai Nikolsky, 1899

Faunal Element: Iranian

Collecting Station (Map 18): 6 (USNM 148569-70). Total - 2 specimens.

Tropiocolotes helenae (Nikolsky, 1907)

Faunal Element: Iranian

Collecting Stations (Map 18): 66 (CAS 120795 [formerly USNM 153692], USNM 153693-703, CAS 120796 [formerly USNM 153704], USNM 153705-10); 68 (USNM 153731). Total - 20 specimens.

Family Lacertidae

Acanthodactylus cantoris blanfordi Boulenger, 1918

Faunal Element: Saharo-Sindian

Collecting Stations (Map 13): 26 (USNM 148656-58); 30 (USNM 148673-75). Total - 6 specimens.

Eremias guttulata watsonana Stoliczka, 1872 (Fig. 7)

Faunal Element: Iranian

Collecting Stations (Map 13): 9 (USNM 148582-83): 16 (USNM 148594); 17 (USNM 148589); 20 (USNM 148623); 23 (USNM 148613); 36 (USNM 149152); 62 (USNM 153593); 67 (USNM 153683); 68 (USNM 153740); 69 (USNM 153686); 99 (USNM 158445-46); 109 (USNM 164824-27). Total - 17 specimens.

Eremias lineolata (Nikolsky, 1896)

Faunal Element: Aralo-Caspian

Collecting Station (Map 13): 8 (USNM 148581). Total - 1 specimen.

Eremias nigrocellata Nikolsky, 1896

Faunal Element: Aralo-Caspian

Collecting Stations (Map 13): 19 (USNM 148605-08); 21 (USNM 148624, 148627-30); 22 (USNM 148625-26); 99 (USNM 158447-48). Total - 13 specimens.

Eremias velox persica Blanford, 1874

Fauanl Element: Iranian

Collecting Stations (Map 14): 15 (USNM 153816); 23 (USNM 148614); 32 (USNM 149143-44); 37 (USNM 149154-55); 77 (USNM 153562); 78 (USNM 153566-78). Total - 20 specimens.

Eremias velox velox (Pallas, 1771)

Faunal Element: Aralo-Caspian

Collecting Stations (Map 14): 46 (USNM 149401-02); 80 (USNM 154486); 96 (USNM 158527). Total - 4 specimens.

Lacerta chlorogaster Boulenger, 1908.

Faunal Element: Aralo-Caspian

Collecting Stations (Map 15): 50 (USNM 149435-37); 51 (USNM 149439-40). Total - 5 specimens.

Lacerta strigata Eichwald, 1831

Faunal Element: Mediterranean

Collecting Stations (Map 15): 51 (USNM 149438); 55 (USNM 149424-26); 89 (USNM 154446-78). Total - 37 specimens.

Lacerta trilineata media Lantz & Cyren, 1920

Faunal Element: Iranian

Collecting Station (Map 15): 85 (USNM 154482-83). Total - 2 specimens.

Ophisops elegans blanfordi Schmidt, 1939

Faunal Element: Saharo-Sindian

Collecting Stations (Map 16): 60 (USNM 157374); 69 (USNM 153687-90); 70 (USNM 153604-74). Total - 76 specimens.

Ophisops elegans elegans Ménétries, 1832 (Fig. 7)

Faunal Element: Iranian

Collecting Stations (Map 16): 0 (USNM 37277); 62 (USNM 153594); 63 (USNM 153588-92); 66 (USNM 153684, 153725-26); 74 (USNM 153733-37); 75 (USNM 153738); 86 (USNM 154480); 101 (USNM 164816-20); 102 (USNM 158450-51, 164814); 103 (USNM 158466-511). Total - 70 specimens.

Family Scincidae

Ablepharus pannonicus Lichtenstein *in* Eversmann, 1823

Faunal Element: Iranian

Collecting Station (Map 19): 69 (USNM 153691). Total - 1 specimen.

Chalcides ocellatus ocellatus (Forskål, 1775)

Faunal Element: Saharo-Sindian

Collecting Station (Map 19): 26 (USNM 148659). Total - 1 specimen.

Eumeces schneideri (Daudin, 1802) (Fig. 8)

Faunal Element: Saharo-Sindian

Collecting Stations (Map 19): 53 (USNM 149414); 61 (USNM 153595); 66 (USNM 153729-30). Total - 4 specimens.

Mabuya aurata affinis (De Filippi, 1865)

Faunal Element: Iranian

Collecting Station (Map 19): 66 (USNM 153727-28). Total - 2 specimens.

Ophiomorus blanfordi Boulenger, 1887

Faunal Element: Saharo-Sindian

Collecting Station (Map 19): 26 (USNM 148660). Total - 1 specimen.

Family Varanidae

Varanus griseus (Daudin, 1803) (Fig. 9)

Faunal Element: Saharo-Sindian

Collecting Stations (Map 17): 28 (USNM 149140); 66 (USNM 160302). Total - 2 specimens.

Suborder Amphisbaenia

Family Trogonophidae

Diplometopon zarudnyi Nikolsky, 1907

Faunal Element: Saharo-Sindian

Collecting Station (Map 9): 2 (USNM 121594). Total - 1 specimen.

Suborder Serpentes

Family Boidae

Eryx jaculus familiaris Eichwald, 1831

Faunal Element: Saharo-Sindian

Collecting Station (Map 20): 2 (USNM 121593). Total - 1 specimen.

Family Colubridae

Coluber karelini Brandt, 1838

Faunal Element: Aralo-Caspian

Collecting Station (Map 21): 20 (USNM 148631). Total - 1 specimen.

Coluber najadum Schinz, 1833

Faunal Element: Mediterranean

Collecting Station (Map 21): 105 (USNM 158462). Total - 1 specimen.

Coluber ravergieri Ménétries, 1832

Faunal Element: Mediterranean

Collecting Station (Map 21): 105 (USNM 158461). Total - 1 specimen.

Coluber rhodorhachis (Jan *in* De Filippi, 1865)

Faunal Element: Mediterranean

Collecting Station (Map 21): 70 (USNM 153743). Total - 1 specimen.

Elaphe longissima Laurenti, 1768

Faunal Element: Mediterranean

Collecting Station (Map 21): 52 (USNM 149412-13). Total - 2 specimens.

Malpolon monspessulanus insignitus (Geoffroy Saint-Hilaire *in* Savigny, 1827)

Faunal Element: Mediterranean

Collecting Station (Map 22): 70 (USNM 153745). Total - 1 specimen.

Psammophis schokari (Forskål, 1775)

Faunal Element: Saharo-Sindian

Collecting Station (Map 22): 39 (USNM 149159). Total - 1 specimen.

Spalerosophis diadema schiraziana Jan *in* De Filippi, 1865

Faunal Element: Iranian

Collecting Station (Map 22): 11 (USNM 148584). Total - 1 specimen.

Spalerosophis diadema cliffordi (Schlegel, 1837)

Faunal Element: Saharo-Sindian

Collecting Stations (Map 22): 2 (USNM 121592); 59 (USNM 157376-77).
Total - 3 specimens.

Spalerosophis microlepis Jan *in* De Filippi, 1865

Faunal Element: Iranian

Collecting Station (Map 22): 68 (USNM 153749). Total - 1 specimen.

Family Elapidae

Microcephalophis gracilis gracilis (Shaw, 1802)

Faunal Element: Oriental

Collecting Station (Map 23): 113 (USNM 159786). Total - 1 specimen.

~~Pelamydrus~~ platurus (Linnaeus, 1766) = PELAMIS PLATURUS (L.)

Faunal Element: Oriental

Collecting Station (Map 23): 26 (USNM 148661-63). Total - 3 specimens.

Praescutata viperina (Schmidt, 1852)

Faunal Element: Oriental

Collecting Station (Map 23): 26 (USNM 148664). Total - 1 specimen.

Family Homalopsidae

Telescopus tessellatus tessellatus (Wall, 1908)

Faunal Element: Iranian

Collecting Station (Map 22): 102 (USNM 158453-54). Total - 2 specimens.

Family Leptotyphlopidae

Leptotyphlops hamulirostris (Nikolsky, 1907)

Faunal Element: Saharo-Sindian

Collecting Station (Map 20): 71 (USNM 157342). Total - 1 specimen.

Leptotyphlops macrorhynchus (Jan, 1861)

Faunal Element: Saharo-Sindian

Collecting Station (Map 20): 102 (USNM 158456). Total - 1 specimen.

Family Natricidae

Eirenis collaris (Ménétries, 1832)

Faunal Element: Iranian

Collecting Station (Map 22): 102 (USNM 158452). Total - 1 specimen.

Eirenis persica (Anderson, 1872)

Faunal Element: Saharo-Sindian

Collecting Stations (Map 22): 59 (USNM 157375); 66 (USNM 153747); 72 (USNM 153741). Total - 3 specimens.

Eirenis punctatolineata (Boettger, 1892)

Faunal Element: Mediterranean

Collecting Station (Map 22): 66 (USNM 153748). Total - 1 specimen.

Natrix natrix persa (Pallas, 1814)

Faunal Element: Mediterranean

Collecting Stations (Map 21): 43 (USNM 149411); 55 (USNM 149430); 89 (USNM 154495, 154498, 154501-03); 105 (USNM 158459). Total - 8 specimens.

Natrix tessellata (Laurenti, 1768)

Faunal Element: Mediterranean

Collecting Stations (Map 21): 55 (USNM 149428-29, 149431); 75 (USNM 153750-51); 89 (USNM 154496-97, 154499-500); 105 (USNM 158460); 108 (USNM 164828). Total - 11 specimens.

Family Typhlopidae

Typhlops vermicularis Merrem, 1820

Faunal Element: Mediterranean

Collecting Stations (Map 20): 41 (USNM 149406); 42 (USNM 149407); 55 (USNM 149427); 58 (USNM 157372); 102 (USNM 158455). Total 5- specimens.

Family Viperidae

Echis carinatus pyramidum (Geoffroy Saint-Hilaire, 1827)

Faunal Element: Saharo-Sindian

Collecting Stations (Map 23): 16 (USNM 148595); 38 (USNM 149158); 66 (USNM 153746); 70 (USNM 153744); 111 (USNM 158437). Total - 5 specimens.

Vipera lebetina obtusa Dvigubsky, 1832

Faunal Element: Mediterranean

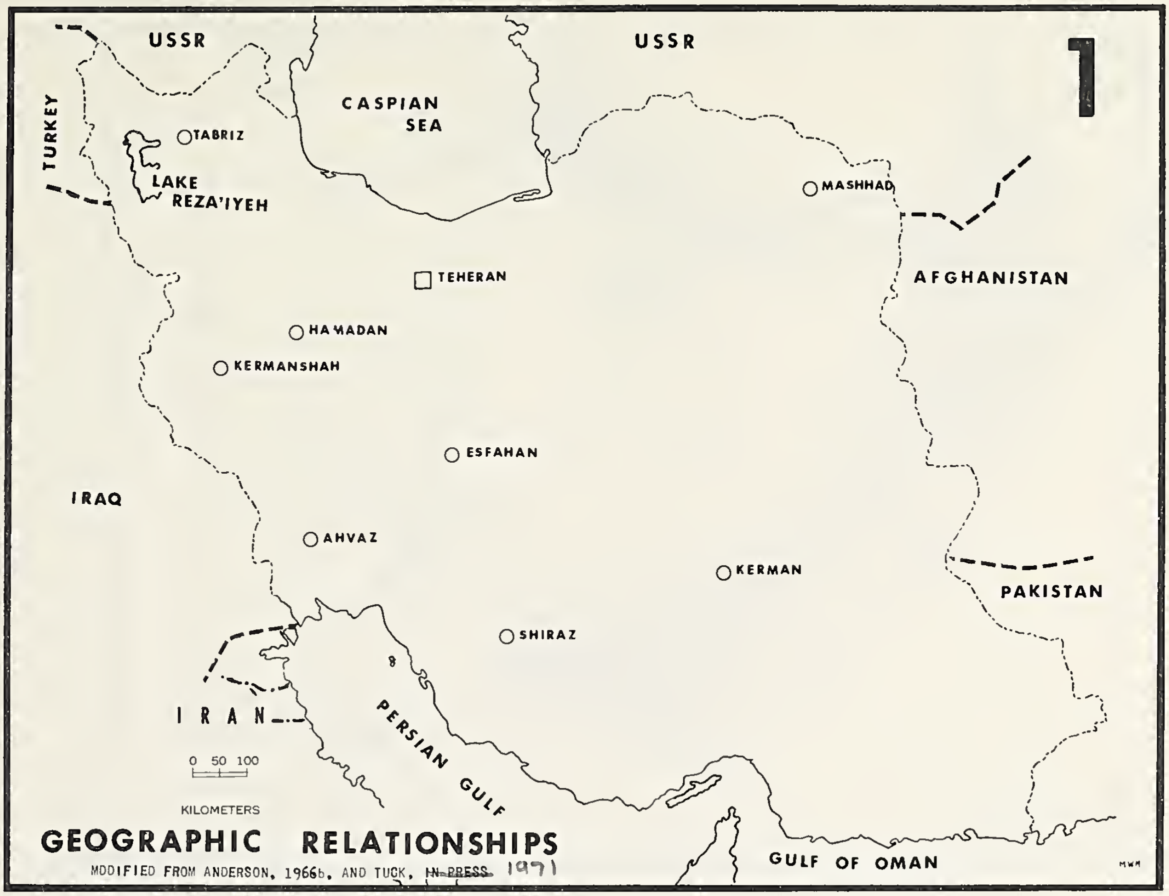
Collecting Station (Map 23): 40 (USNM 149394). Total - 1 specimen.

TABLE 1

	Collecting Station & Locality (Maps 2 & 5)	*Physiography (Map 3)*
0.	"Northern Persia" (?) NOT MAPPED	?
1.	East Persia: Tara Sirkuh (?) NOT MAPPED	?
2.	Khuzistan: Ahvaz (31°19'N, 48°42'E)	Khuzistan Plain
3.	Fars: Bushehr (28°59'N, 50°50'E)	Gulf Coast Plain
4.	"Daghestan"	Caspian Coast
5.	Strait of Hormuz (26°34'N, 56°15'E)	——
6.	Khurasan: 10 km. E. Doruneh (35°10'N, 57°18'E)	Central Plateau
7.	Khurasan: 15 km. E. Doruneh	Central Plateau
8.	Khurasan: 15 km. N.W. Doruneh	Central Plateau
9.	Khurasan: Doruneh	Central Plateau
10.	Khurasan: 2 km. N.E. Doruneh	Central Plateau
11.	Khurasan: 5 km. N. Kashmar (35°12'N, 58°27'E)	Central Plateau
12.	Khurasan: Torbat-e Heydariyeh (35°16'N, 59°13'E)	Central Plateau
13.	Khurasan: 6 km. E.N.E. Roshkhvar (34°58'N, 59°37'E)	Central Plateau
14.	Khurasan: 25 km. N. Roshkhvar	Central Plateau
15.	Khurasan: 1.5 km. E. Khajar (35°06'N, 59°42'E)	Central Plateau
16.	Khurasan: 6 km. W. Ayubi (34°18'N, 60°35'E)	Central Plateau
17.	Khurasan: 18 km. N. Torbat-e Heydariyeh	Central Plateau
18.	Khurasan: 4 km. N.N.E. Jangal (34°43'N, 59°15'E)	Central Plateau
19.	Khurasan: 15 km. N.E. Jangal	Central Plateau
20.	Khurasan: 1 km. S. Esfideh (33°39'N, 59°46'E)	Central Plateau
21.	Khurasan: Esfideh	Central Plateau
22.	Khurasan: 5 km. N.E. Esfideh	Central Plateau
23.	Khurasan: 55 km. E.N.E. Birjand (32°53'N, 59°13'E)	Seistan Basin
24.	Khurasan: 61 km. E.N.E. Birjand	Seistan Basin
25.	Khurasan: Mazhan (32°35'N, 59°01'E)	Seistan Basin
26.	Seistan & Baluchistan: Chah-Bahar (25°18'N, 60°37'E)	Makran Coast
27.	Seistan & Baluchistan: 21 km. E. Chah-Bahar	Makran Coast
28.	Seistan & Baluchistan: 30 km. N. Iranshahr (27°13'N, 60°41'E)	Central Plateau
29.	Seistan & Baluchistan: 6 km. N. Khash (28°14'N, 64°14'E)	Seistan Basin
30.	Seistan & Baluchistan: Khash	Seistan Basin
31.	Seistan & Baluchistan: 15 km. N. Khash	Seistan Basin
32.	Seistan & Baluchistan: Zahedan (29°30'N, 60°52'E)	Seistan Basin
33.	Seistan & Baluchistan: 85 km. N. Zahedan	Seistan Basin
34.	Seistan & Baluchistan: 5 km. N.N.E. Kahoorak (29°26'N, 59°52'E)	Central Plateau
35.	Kerman: Fahraj (28°58'N, 58°52'E)	Central Plateau
36.	Kerman: 28 km. S.W. Mashiz (29°56'N, 56°37'E)	Central Plateau
37.	Kerman: 40 km. S.E. Sa'idabad (29°28'N, 55°42'E)	Central Plateau
38.	Kerman: 5 km. E. Bandar 'Abbas (27°11'N, 56°17'E)	Gulf Coast Plain
39.	Fars: 50 km. N. Lar (27°41'N, 54°17'E)	Zagros Mountains
40.	Khurasan: 6 km. E. Bojnurd (37°28'N, 57°19'E)	Kopet Dagh
41.	Mazanderan: 5 km. E.N.E. Dasht (37°17'N, 56°07'E)	Kopet Dagh
42.	Mazanderan: 11 km. W. Dasht	Kopet Dagh
43.	Mazanderan: 25 km. E. Gorgan (36°50'N, 54°29'E)	Türkmen Steppe
44.	Mazanderan: 13 km. E. Dasht	Kopet Dagh
45.	Mazanderan: 1 km. N.E. Dasht	Kopet Dagh
46.	Mazanderan: 3 km. S.W. Dasht	Alborz Mountains
47.	Mazanderan: 8 km. W. Dasht	Kopet Dagh
48.	Mazanderan: 15 km. W. Dasht	Kopet Dagh
49.	Mazanderan: 35 km. N. Gorgan	Türkmen Steppe
50.	Mazanderan: 18 km. S.W. Shah-Pasand (37°07'N, 55°16'E)	Türkmen Steppe
51.	Mazanderan: 22 km. S.W. Shah-Pasand	Türkmen Steppe
52.	Mazanderan: 20 km. E. Gorgan	Türkmen Steppe
53.	Mazanderan: 42 km. N. Gorgan	Türkmen Steppe
54.	Mazanderan: 75 km. N. Gorgan	Türkmen Steppe
55.	Mazanderan: 28 km. W. Gorgan; Garareh-su River	Türkmen Steppe
56.	Mazanderan: 24 km. W. Mahmudabad (36°38'N, 52°15'E)	Caspian Coast
57.	Teheran: 36-38 km. W. Firuzkuh (35°45'N, 52°47'E)	Alborz Mountains

TABLE 1 (continued)

	Collecting Station & Locality (Maps 2 & 5)	*Physiography (Map 3)*
58.	Khuzistan: 6 km. S. Khorramabad (33°30′N, 48°20′E)	Zagros Mountains
59.	Khuzistan: Dehloran; Ali Khosh (32°41′N, 47°16′E)	Khuzistan Plain
60.	Khuzistan: Dehloran	Khuzistan Plain
61.	Fars: 38 km. W. Shiraz (29°36′N, 52°32′E)	Zagros Mountains
62.	Fars: 1 km. N. Takht-e Jamshid (Persepolis) and 7 km. N. Takht-e Jamshid; Naqsh-e Rustam (29°57′N, 52°52′E)	Zagros Mountains
63.	Fars: 10 km. S. Deh Bid (30°38′N, 53°13′E)	Zagros Mountains
64.	Fars: 27 km. N. Abadeh (31°10′N, 52°37′E)	Central Plateau
65.	Esfahan: 20 km. S.E. Anar (30°53′N, 55°18′E)	Central Plateau
66.	Khuzistan: 35 km. E. Gachsaran (30°12′N, 50°47′E)	W. Foothills Zagros
67.	Khuzistan: 10 km. W.N.W. Behbehan (30°35′N, 50°14′E)	W. Foothills Zagros
68.	Khuzistan: 18 km. S. Masjed Soleyman (31°50′N, 49°18′E)	W. Foothills Zagros
69.	Khuzistan: 30 km. S. Andimeshk (32°27′N, 48°21′E)	Khuzistan Plain
70.	Khuzistan: 45 km. N. Ahvaz	Khuzistan Plain
71.	Kermanshahan: 8 km. E. Qasr-e Shirin (34°31′N, 45°35′E)	Khuzistan Plain
72.	Kermanshahan: 24 km. W. Karand (34°16′N, 46°15′E)	W. Foothills Zagros
73.	Khuzistan: 17.5 km. S.W. Borujerd (33°54′N, 48°46′E)	Zagros Mountains
74.	Khuzistan: 50 km. S.W. Borujerd	Zagros Mountains
75.	Khuzistan: 10 km. W. Khorramabad	Zagros Mountains
76.	Teheran/Mazanderan: 10 km. N.W. Kashan (33°59′N, 51°28′E)	Central Plateau
77.	Teheran: 35 km. S. Delijan (33°59′N, 50°40′E)	Central Plateau
78.	Esfahan/Teheran: 150 km. N. Esfahan (32°40′N, 51°38′E)	Central Plateau
79.	Khurasan: Mashhad (36°18′N, 59°36′E)	Central Plateau
80.	Khurasan: 20 km. E. Mashhad	Türkmen Steppe
81.	Khurasan: 90 km. W. Quchan (37°06′N, 58°30′E)	Kopet Dagh
82.	Mazanderan: 150 km. W. Bojnurd (37°28′N, 57°19′E)	Kopet Dagh
83.	Kermanshahan: vicinity of Kangavar (34°30′N, 47°58′E)	Zagros Mountains
84.	Kermanshahan: Bisotun (34°23′N, 47°26′E)	Zagros Mountains
85.	Kermanshahan: 42 km. W. Kermanshah (34°19′N, 47°04′E)	W. Foothills Zagros
86.	Kurdistan: 20 km. N. Hamadan (34°48′N, 48°30′E)	Zagros Mountains
87.	Gilan: 20 km. E. Rasht (37°16′N, 49°36′E)	Caspian Coast
88.	Gilan: Bandar-e Pahlavi (37°28′N, 49°47′E)	Caspian Coast
89.	East Azerbaijan: Astara (38°26′N, 48°52′E)	Caspian Coast
90.	Gilan: 45 km. S. Astara	Caspian Coast
91.	East Azerbaijan: 8 km. S. Marand (38°26′N, 45°46′E)	Urmia Basin
92.	East/West Azerbaijan: Jolfa (38°57′N, 45°38′E)	Mughan Steppe
93.	West Azerbaijan: 25 km. S.E. Shahpur (38°11′N, 44°47′E)	Urmia Basin
94.	West Azerbaijan: 22 km. N. Reza'iyeh (37°33′N, 45°04′E)	Urmia Basin
95.	East Azerbaijan: 5 km. S.E. Mianeh (37°26′N, 47°42′E)	Alborz Mountains
96.	Mazanderan: 34 km. N.N.E. Shahrud (36°25′N, 55°01′E)	Alborz Mountains
97.	Mazanderan: 39.5 km. W. 'Abbasabad (36°22′N, 56°25′E)	Central Plateau
98.	Mazanderan: 5 km. W. 'Abbasabad	Central Plateau
99.	Khurasan: 30 km. E. Sabzevar (36°13′N, 57°42′E)	Central Plateau
100.	Esfahan: 4 km. S.S.W. Anarak (33°20′N, 53°42′E)	Central Plateau
101.	Esfahan: 45 km. S.W. Natanz (33°31′N, 51°54′E)	Central Plateau
102.	Khuzistan: 5 km. N.W. Dowrud (33°28′N, 49°04′E)	Zagros Mountains
103.	Kurdistan: 32 km. W.N.W. Sanandaj (35°19′N, 47°00′E)	W. Foothills Zagros
104.	Kurdistan: 66 km. N.W. Sanandaj	W. Foothills Zagros
105.	Kurdistan: 4 km. E. Marivan (35°31′N, 46°10′E)	W. Foothills Zagros
106.	West Azerbaijan: 32 km. N.N.W. Sardasht (36°09′N, 45°28′E)	W. Foothills Zagros
107.	West Azerbaijan: 5 km. S.E. Shahin Dezh (36°40′N, 46°33′E)	Zagros Mountains
108.	Teheran: 22 km. N. Teheran (35°40′N, 51°26′E)	Alborz Mountains
109.	Fars: 13 km. S.E. Shiraz (29°36′N, 52°32′E)	Zagros Mountains
110.	Fars: 110 km. S.E. Shiraz	Zagros Mountains
111.	Fars: 5 km. N. Juyom (28°10′N, 53°52′E)	Zagros Mountains
112.	Khuzistan: Khorramabad	Zagros Mountains
113.	Persian Gulf: nr. Khark Island (29°15′N, 50°20′E)	——



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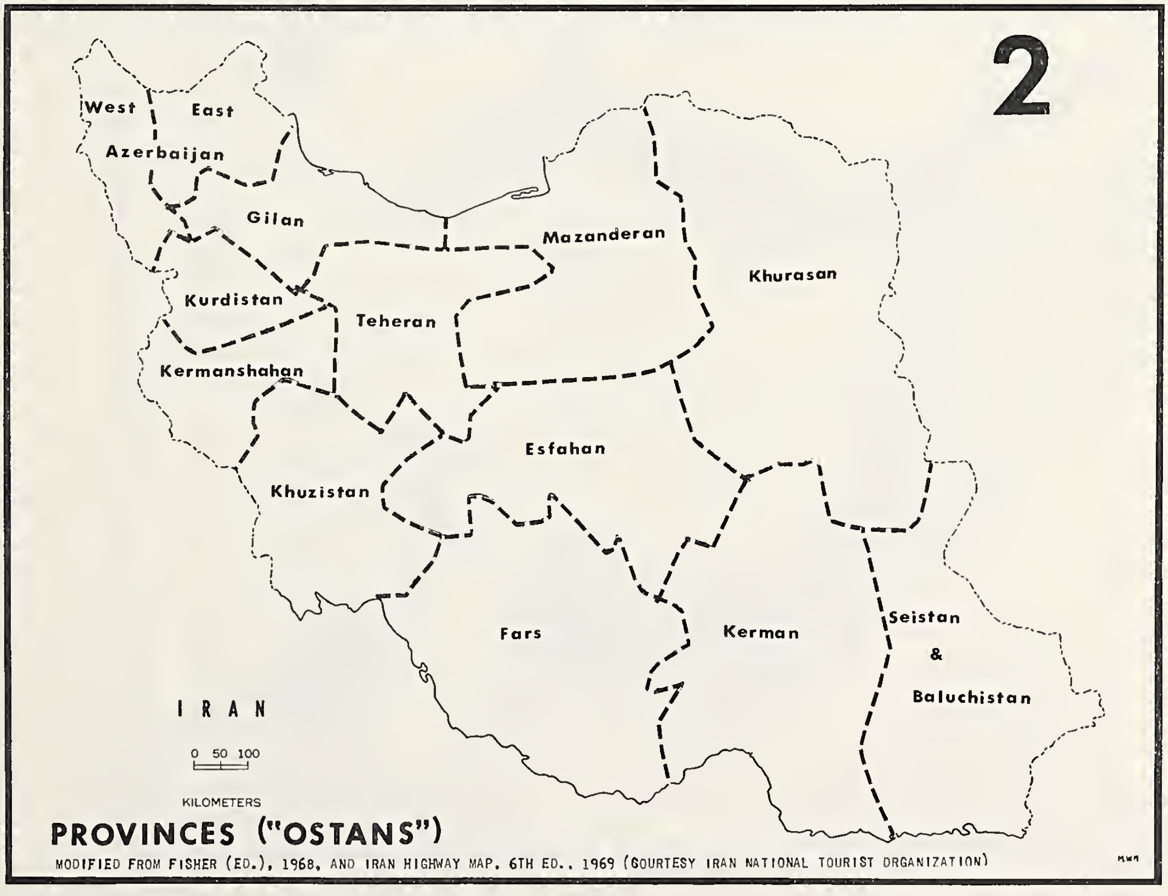

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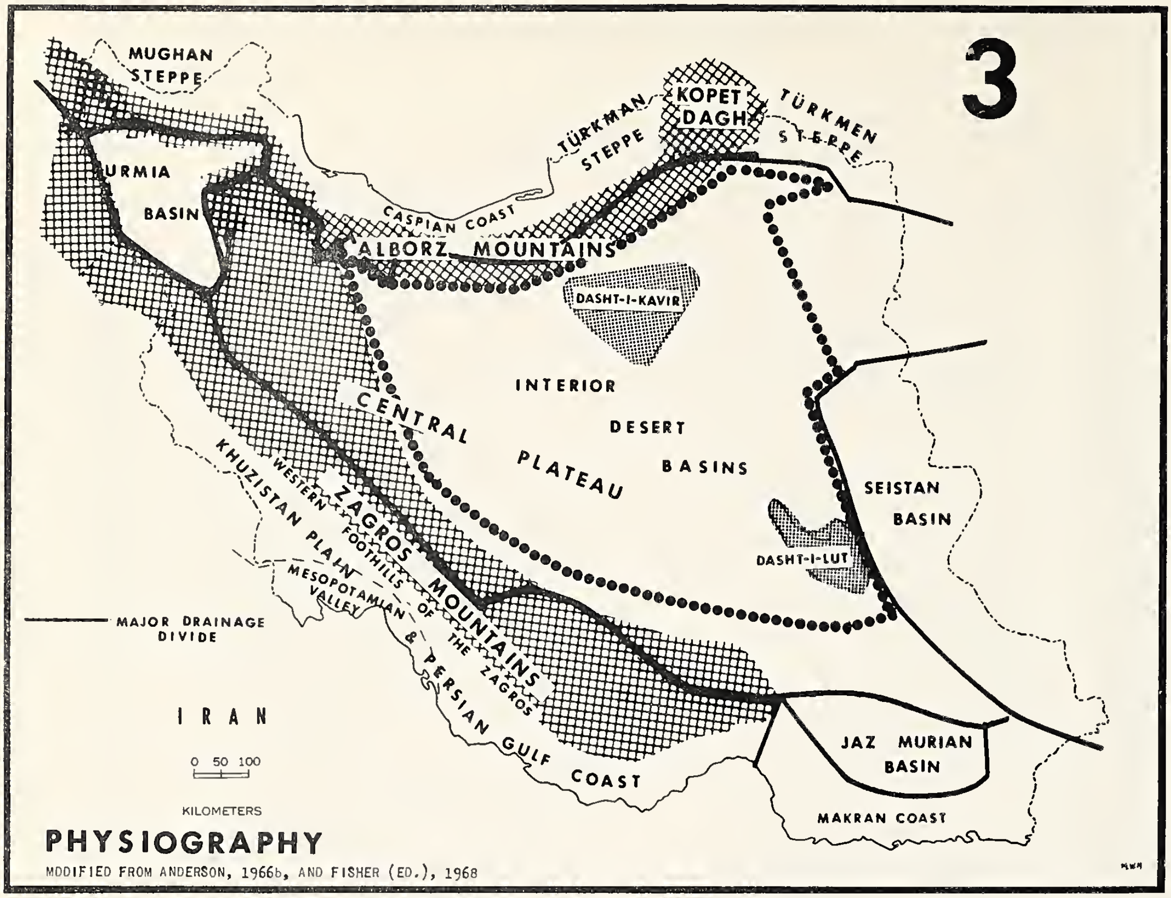

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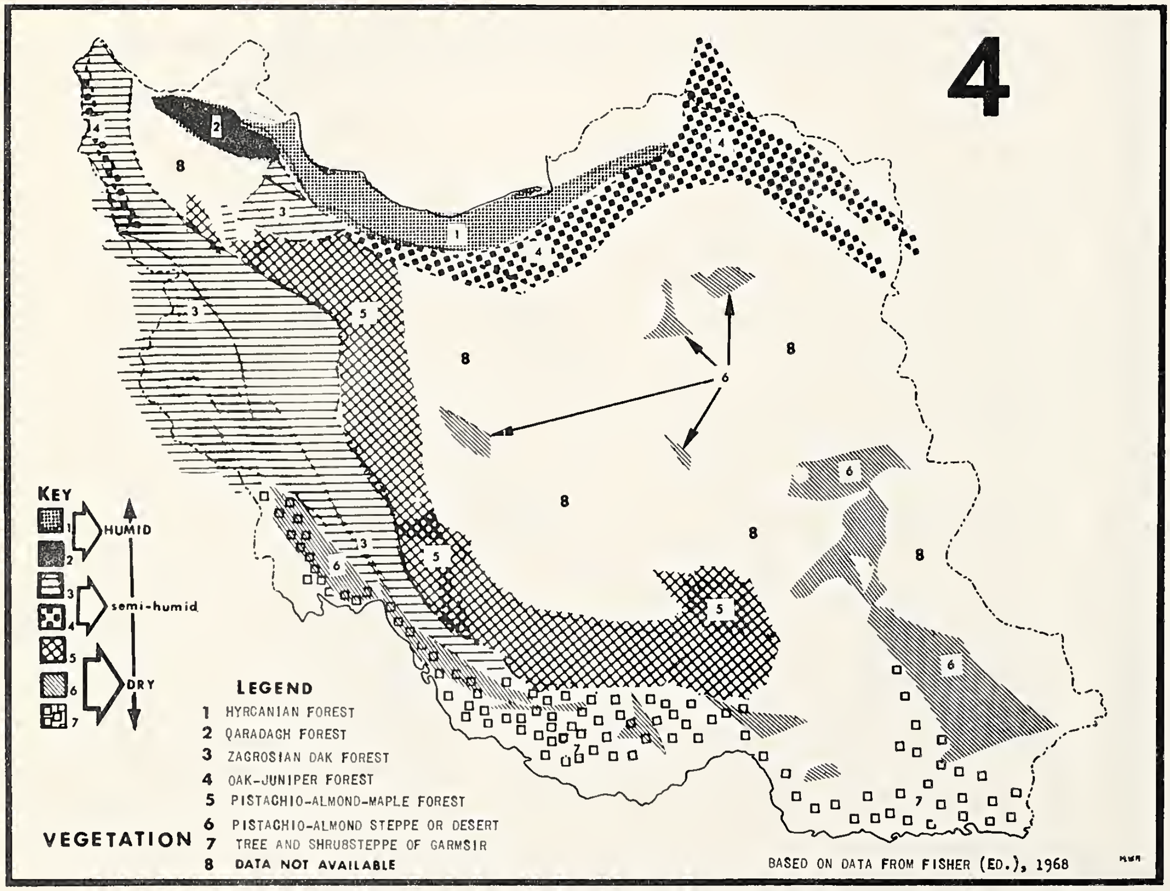
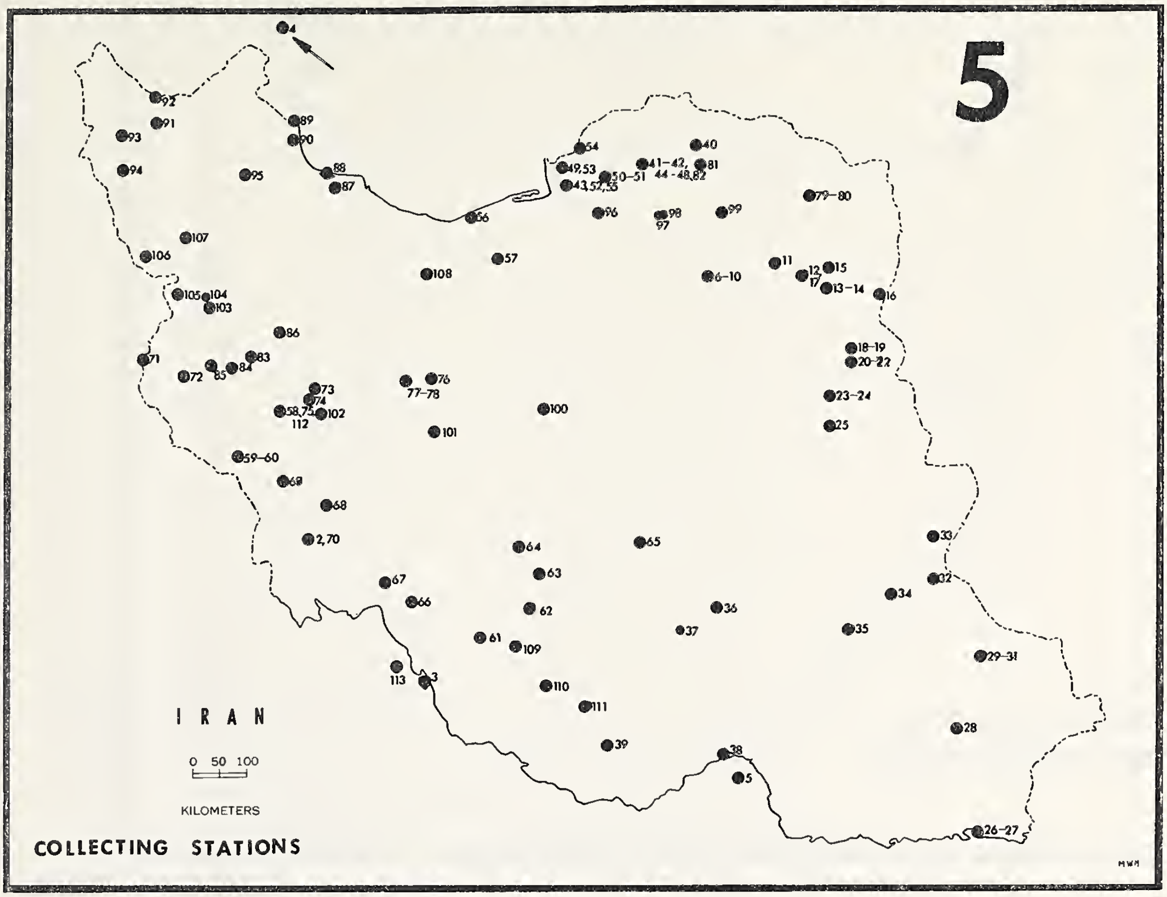


LEGEND

1 HYRCANIAN FOREST
2 QARADAGH FOREST
3 ZAGROSIAN OAK FOREST
4 OAK-JUNIPER FOREST
5 PISTACHIO-ALMOND-MAPLE FOREST
6 PISTACHIO-ALMOND STEPPE OR DESERT
7 TREE AND SHRUBSTEPPE OF GARMSIR
8 DATA NOT AVAILABLE

VEGETATION

BASED ON DATA FROM FISHER (ED.), 1968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26–27
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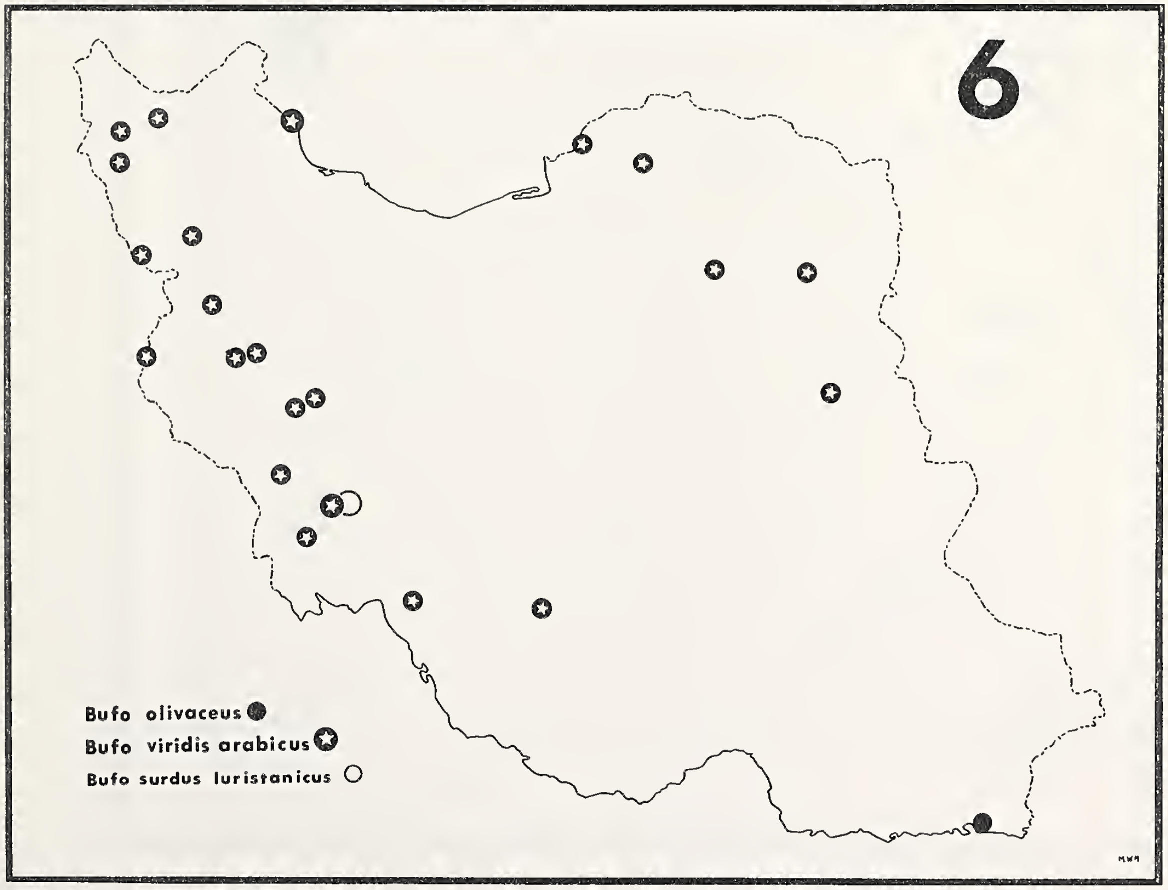
KILOMETERS
COLLECTING STATIONS
MWM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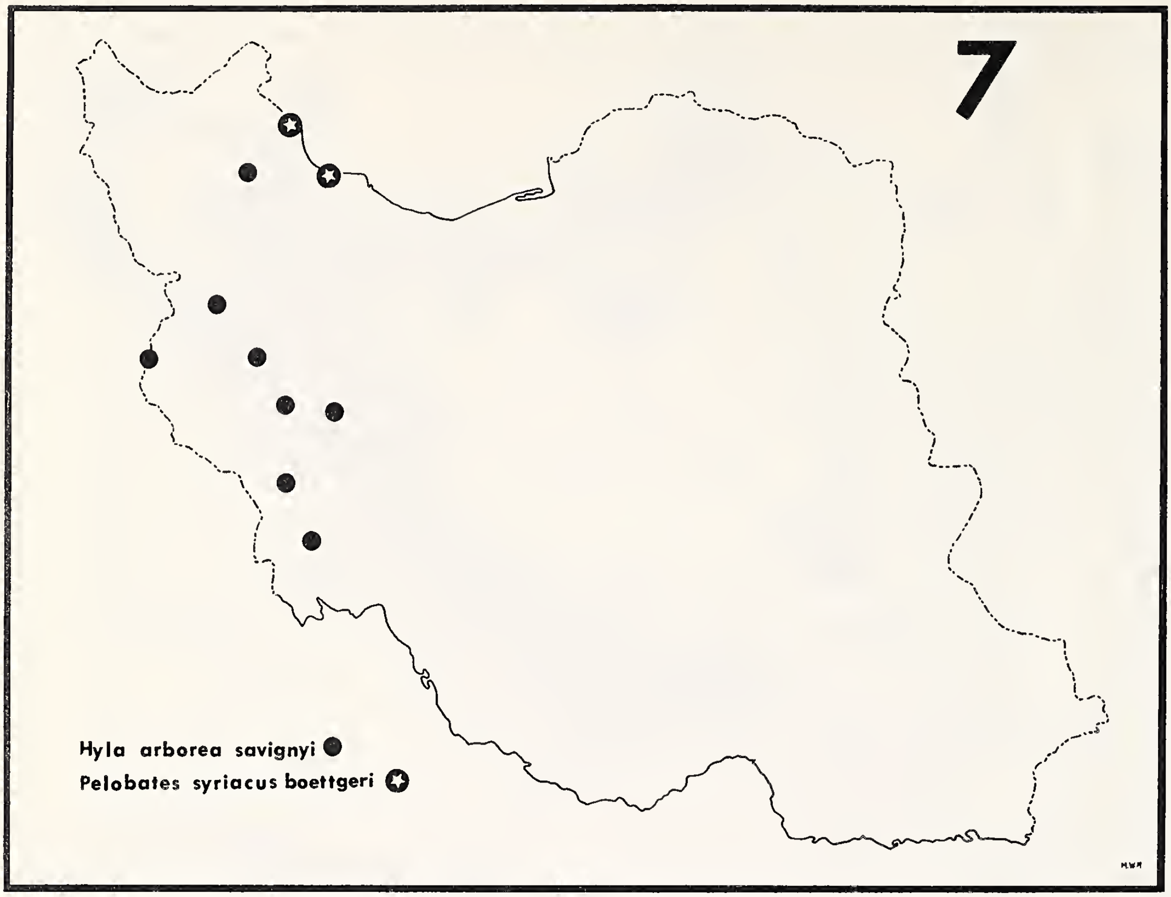
Bufo viridis arabicus ✪
Bufo surdus luristanicus ○
MWM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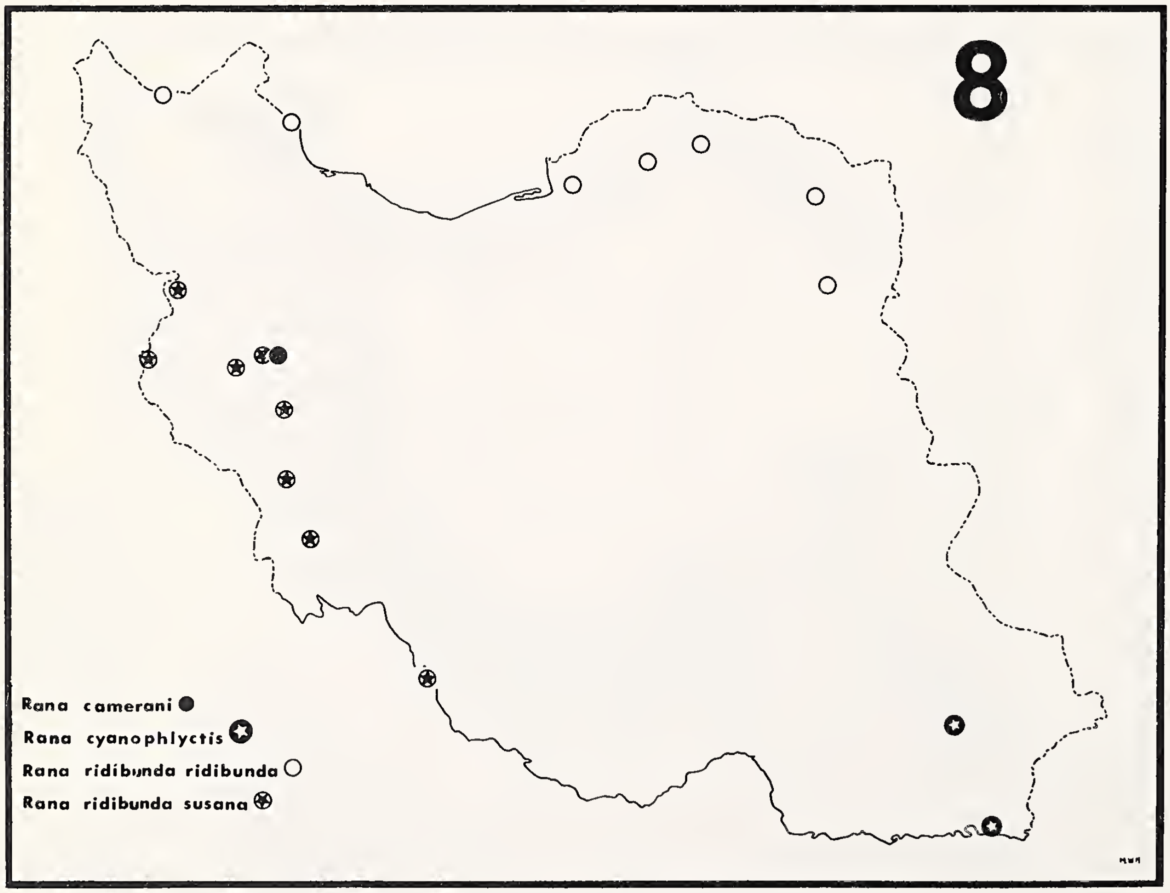
Hyla arborea savignyi ●
Pelobates syriacus boettgeri ✪
MWR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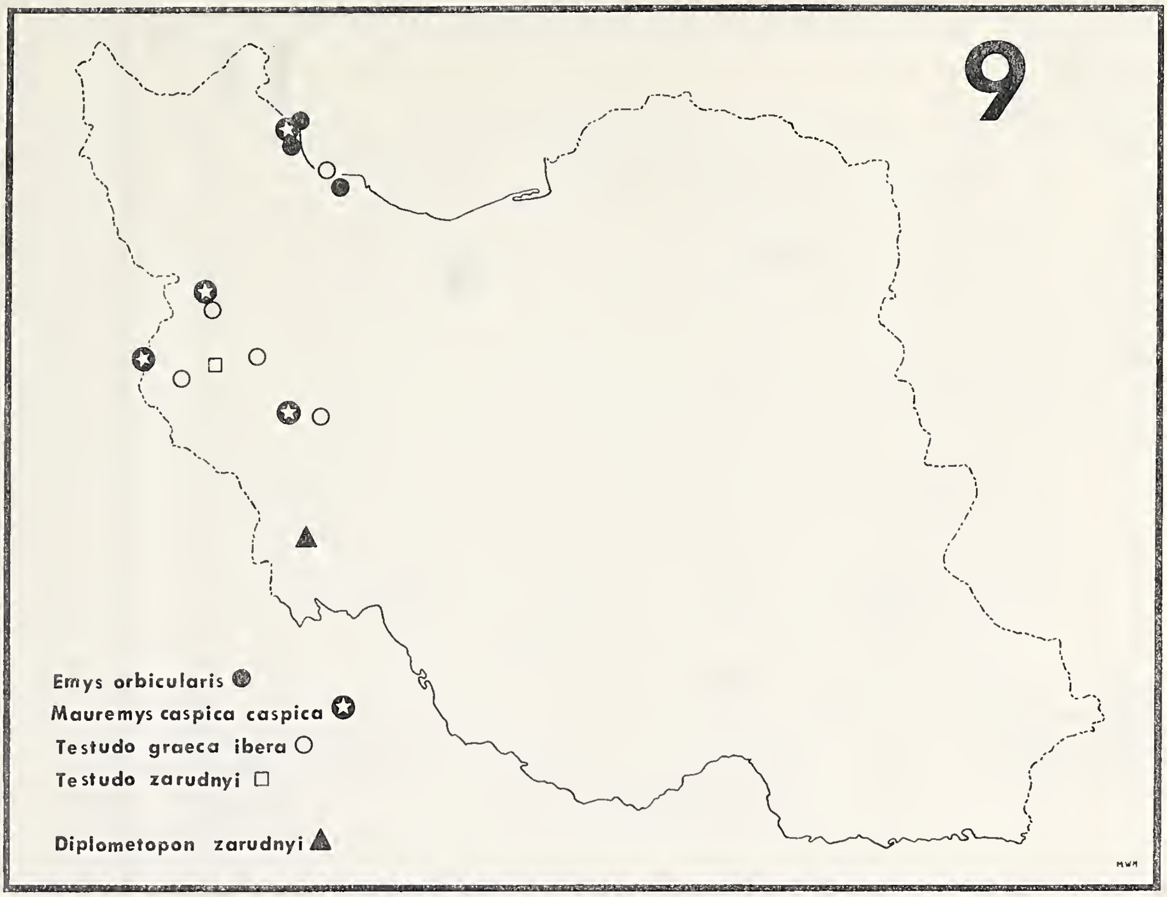
Rana camerani ●
Rana cyanophlyctis ✪
Rana ridibunda ridibunda ○
Rana ridibunda susana ⊛
MWR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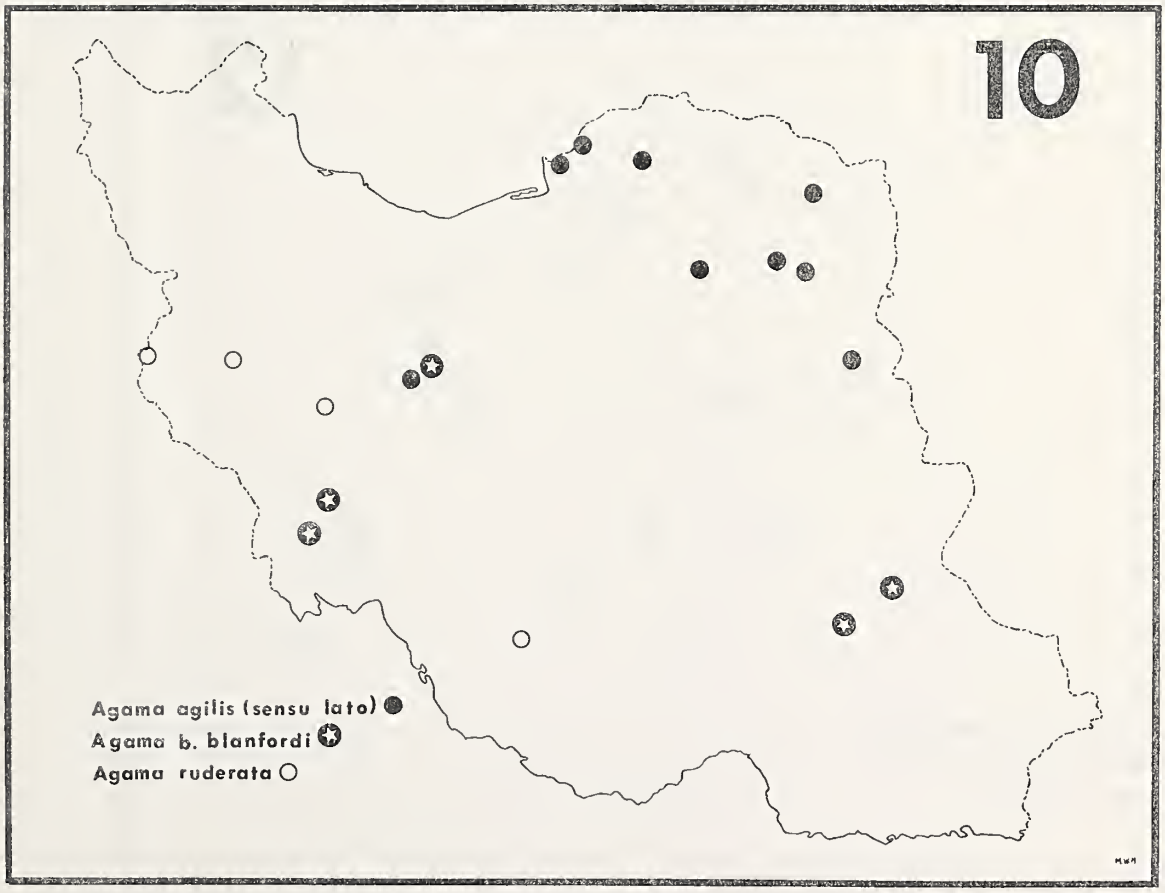
Emys orbicularis ●
Mauremys caspica caspica ✪
Testudo graeca ibera ○
Testudo zarudnyi □
Diplometopon zarudnyi ▲
MWH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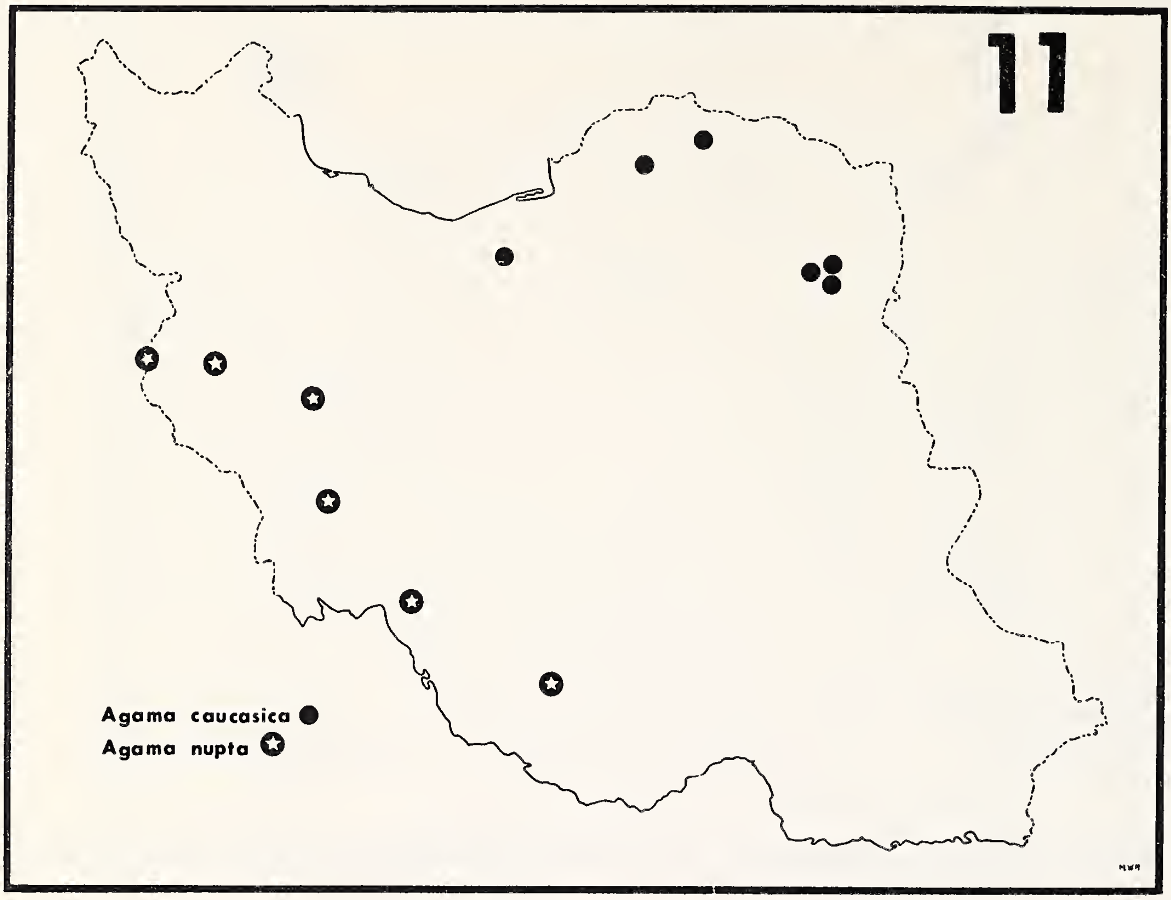
Agama agilis (sensu lato) ●
Agama b. blanfordi ✪
Agama ruderata ○
MWH



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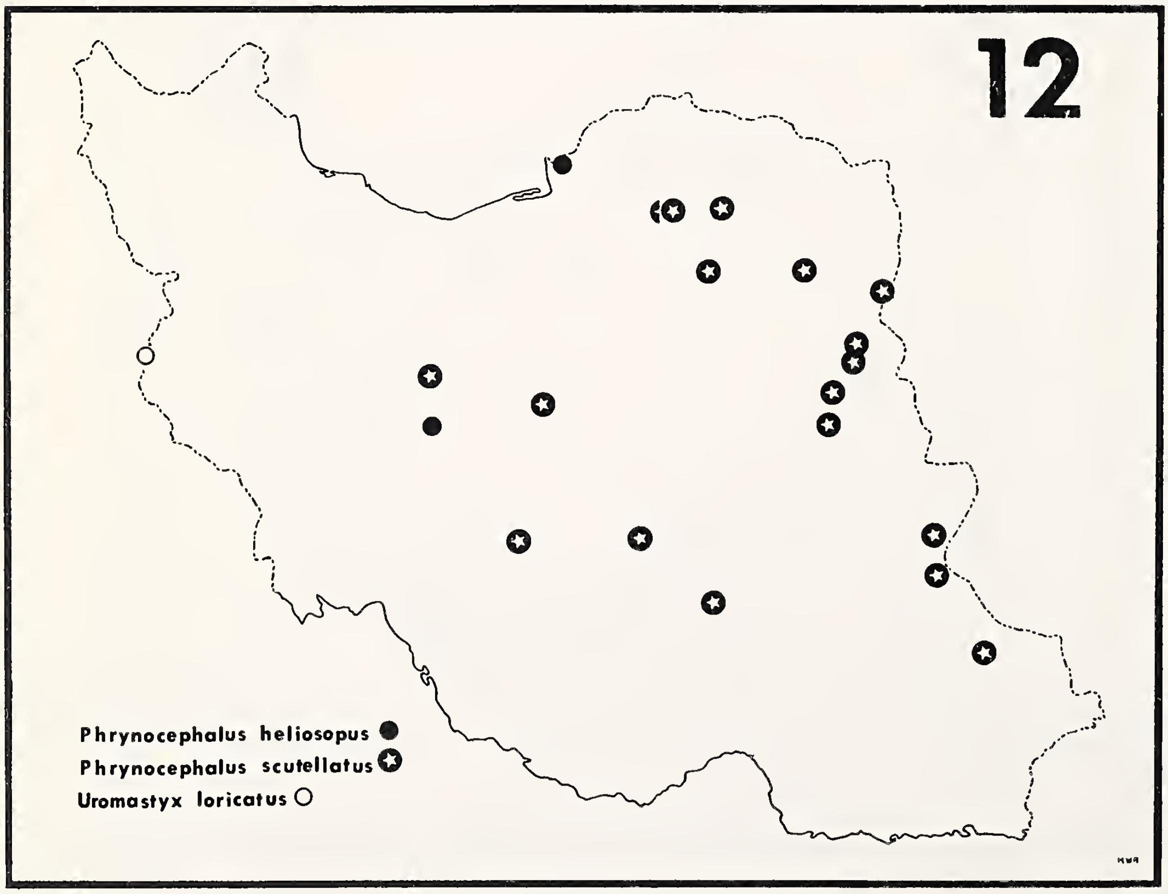
Agama caucasica ●
Agama nupta ✪



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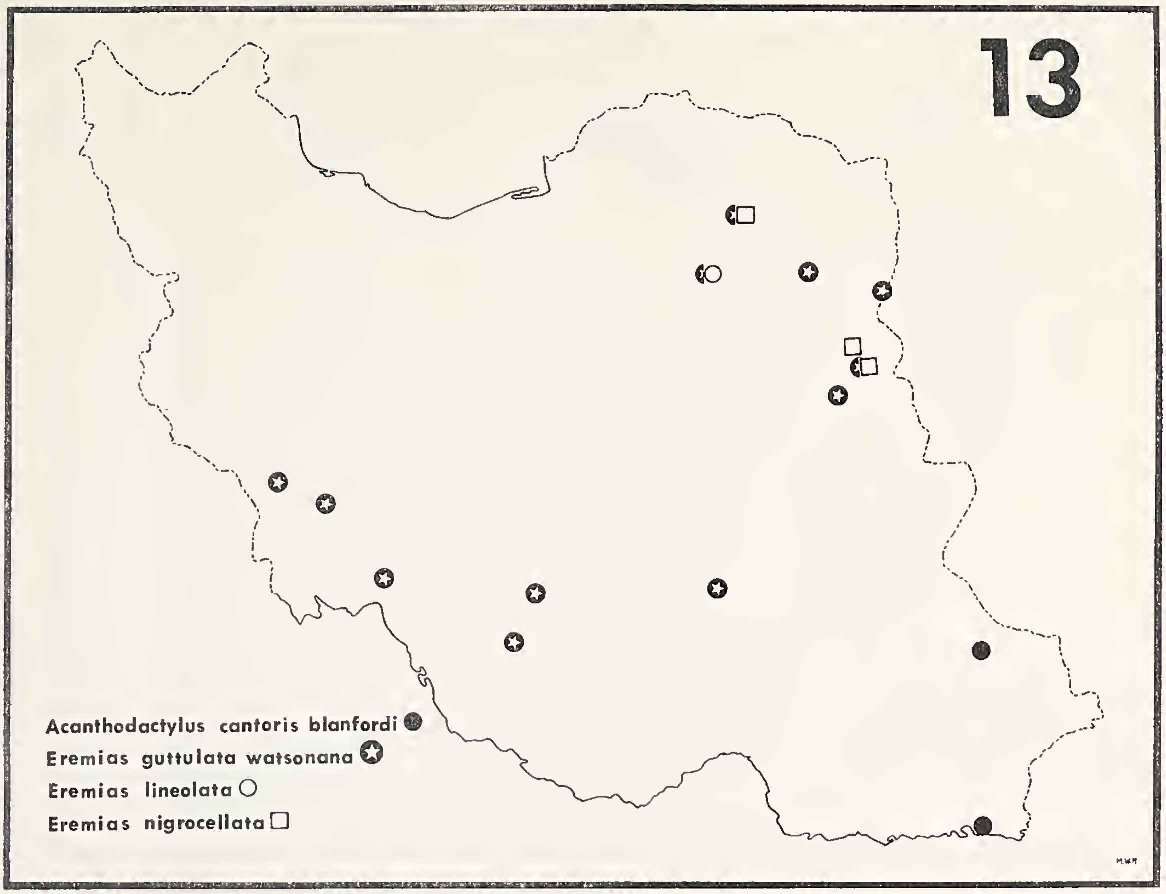
Phrynocephalus heliosopus ●
Phrynocephalus scutellatus ✪
Uromastyx loricatus ○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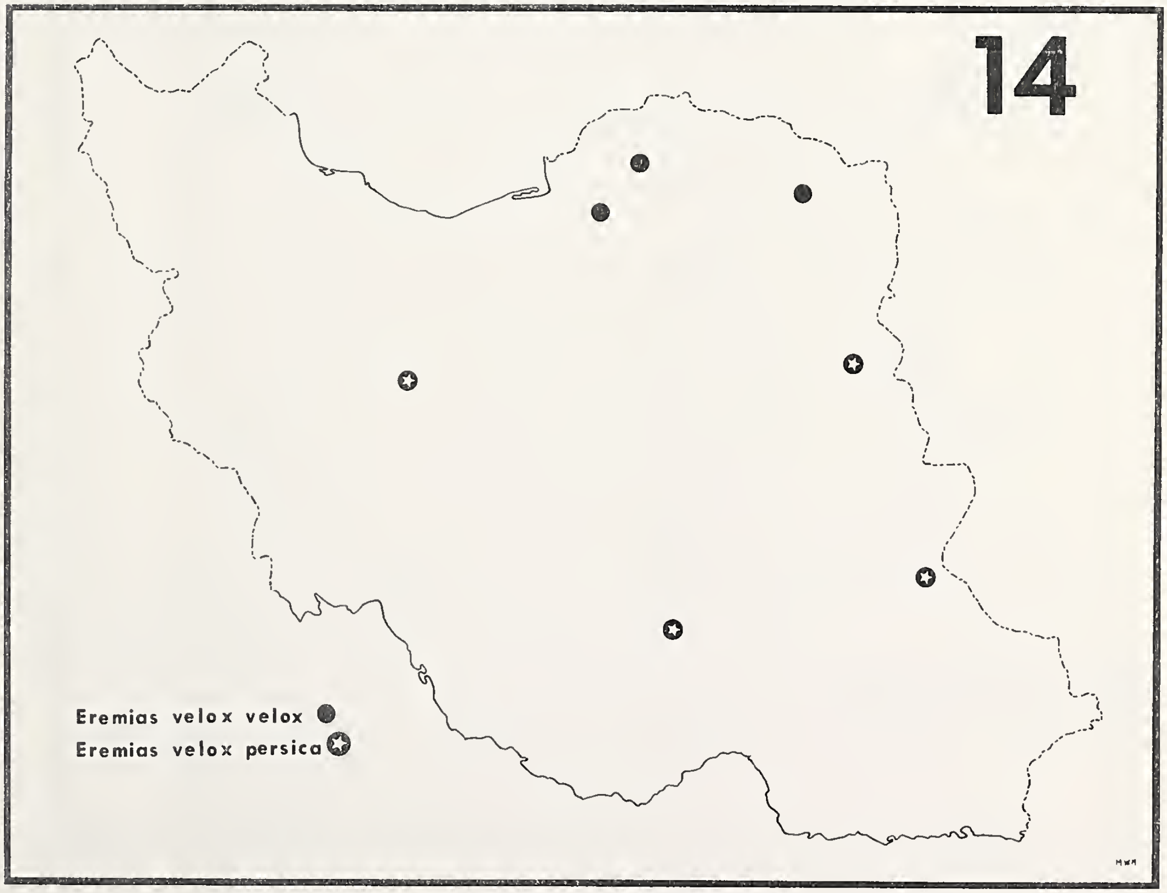
Acanthodactylus cantoris blanfordi ●
Eremias guttulata watsonana ✪
Eremias lineolata ○
Eremias nigrocellata □
MWM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Eremias velox velox ●
Eremias velox persica ✪
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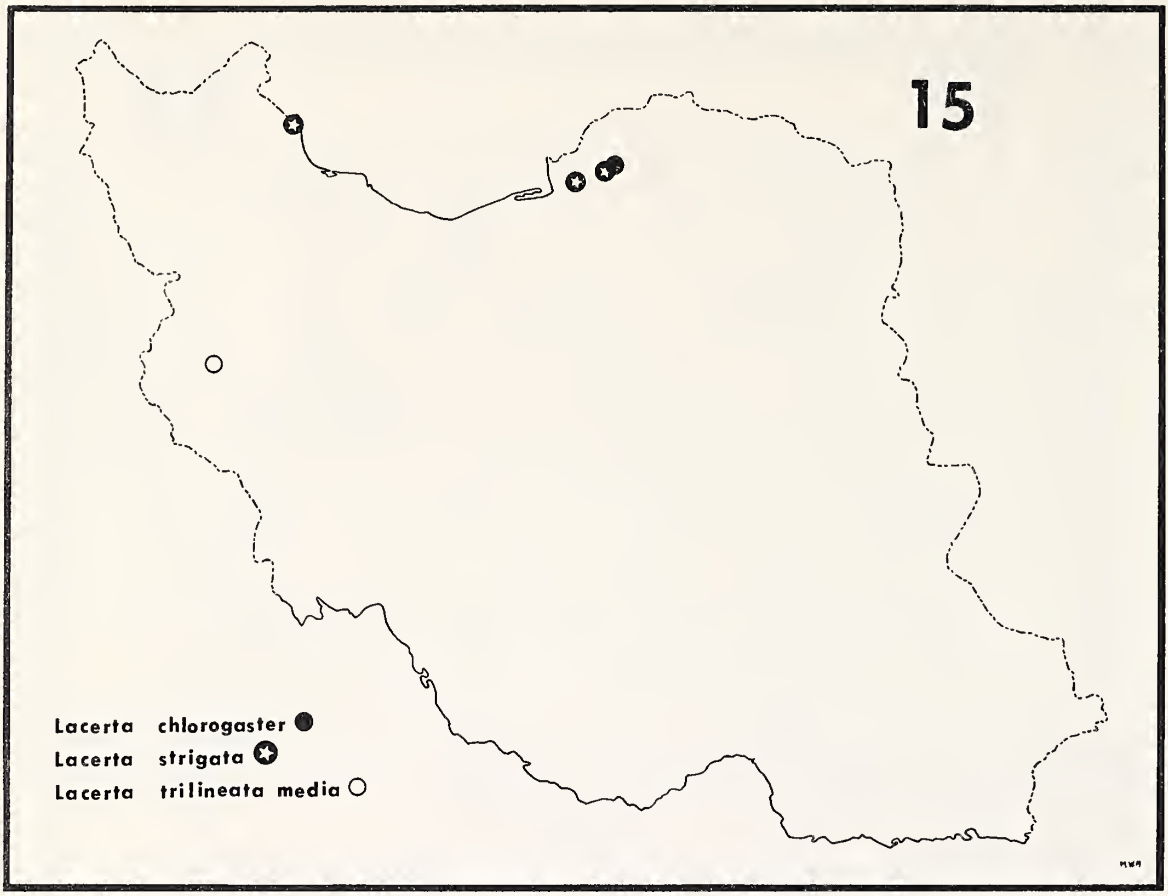
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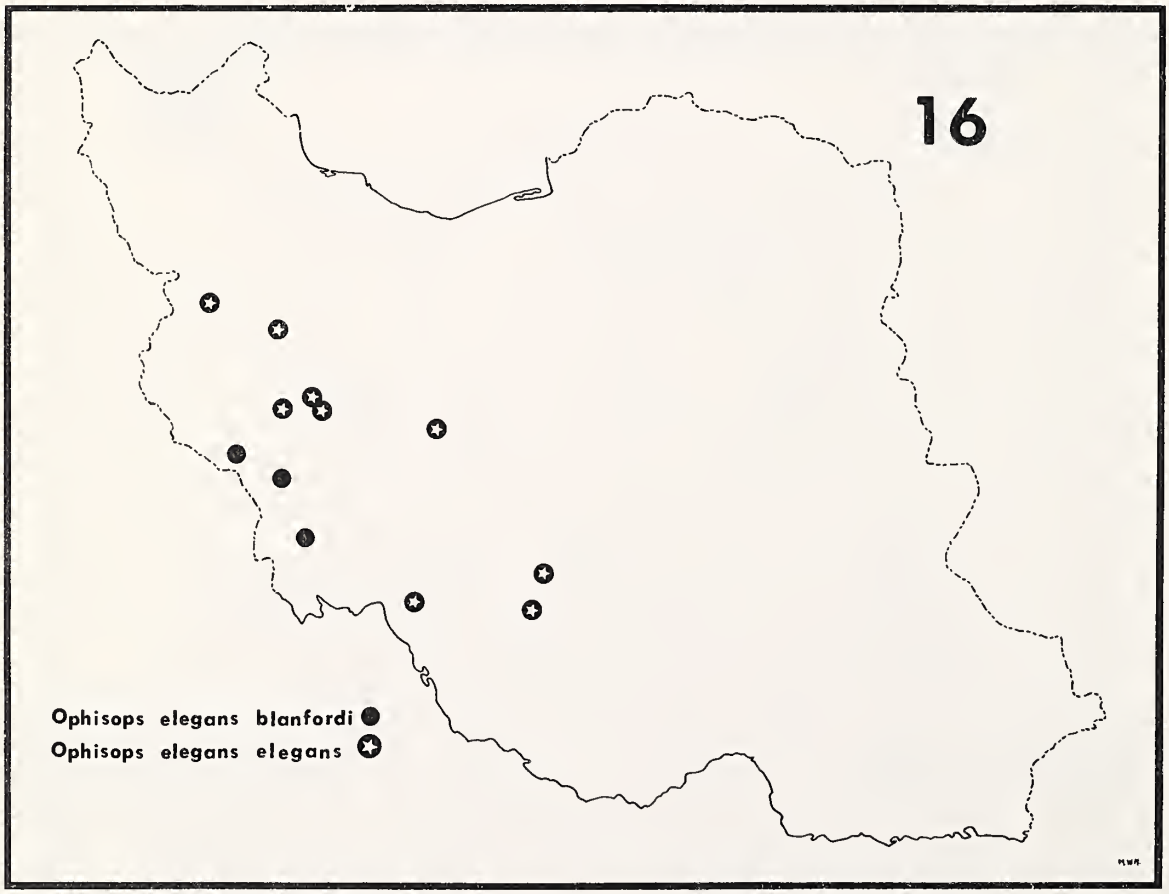
Lacerta chlorogaster ●
Lacerta strigata ✪
Lacerta trilineata media ○
MWR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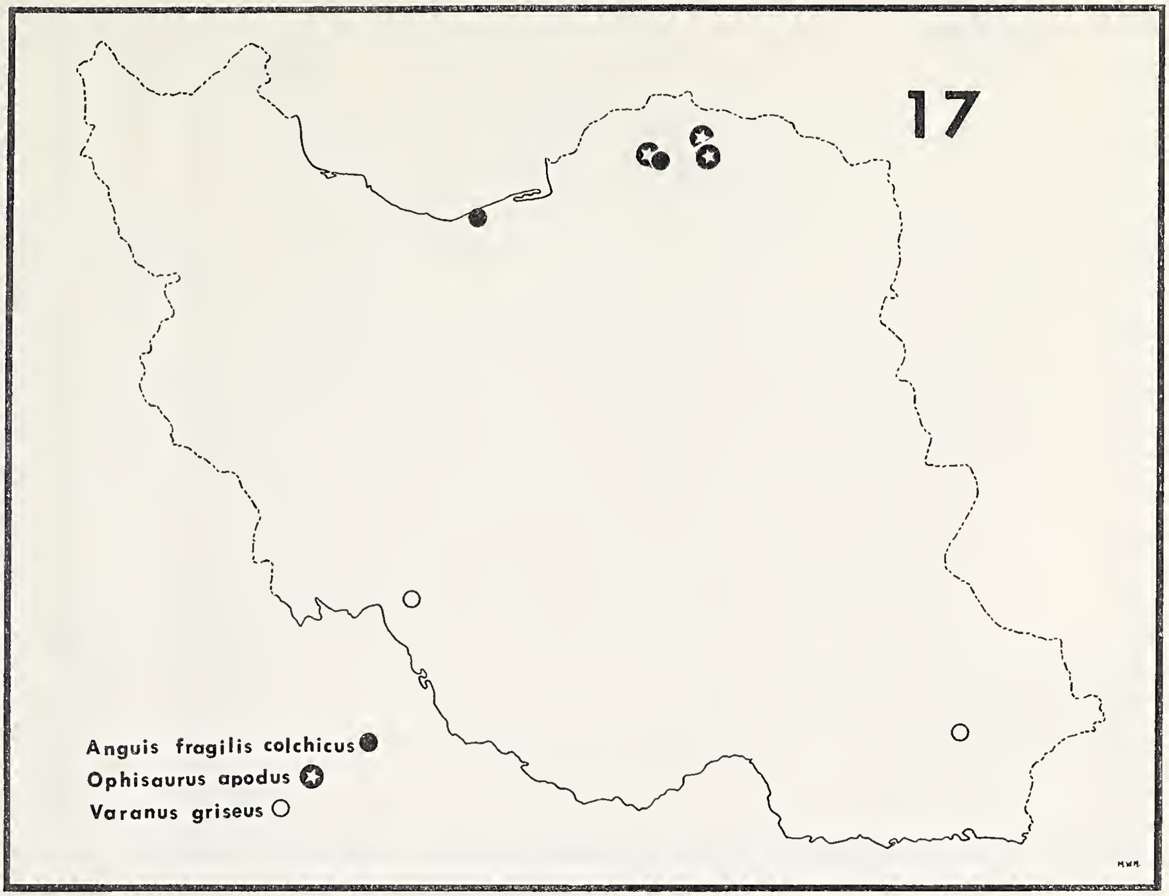
Ophisops elegans blanfordi ●
Ophisops elegans elegans ✪
MWR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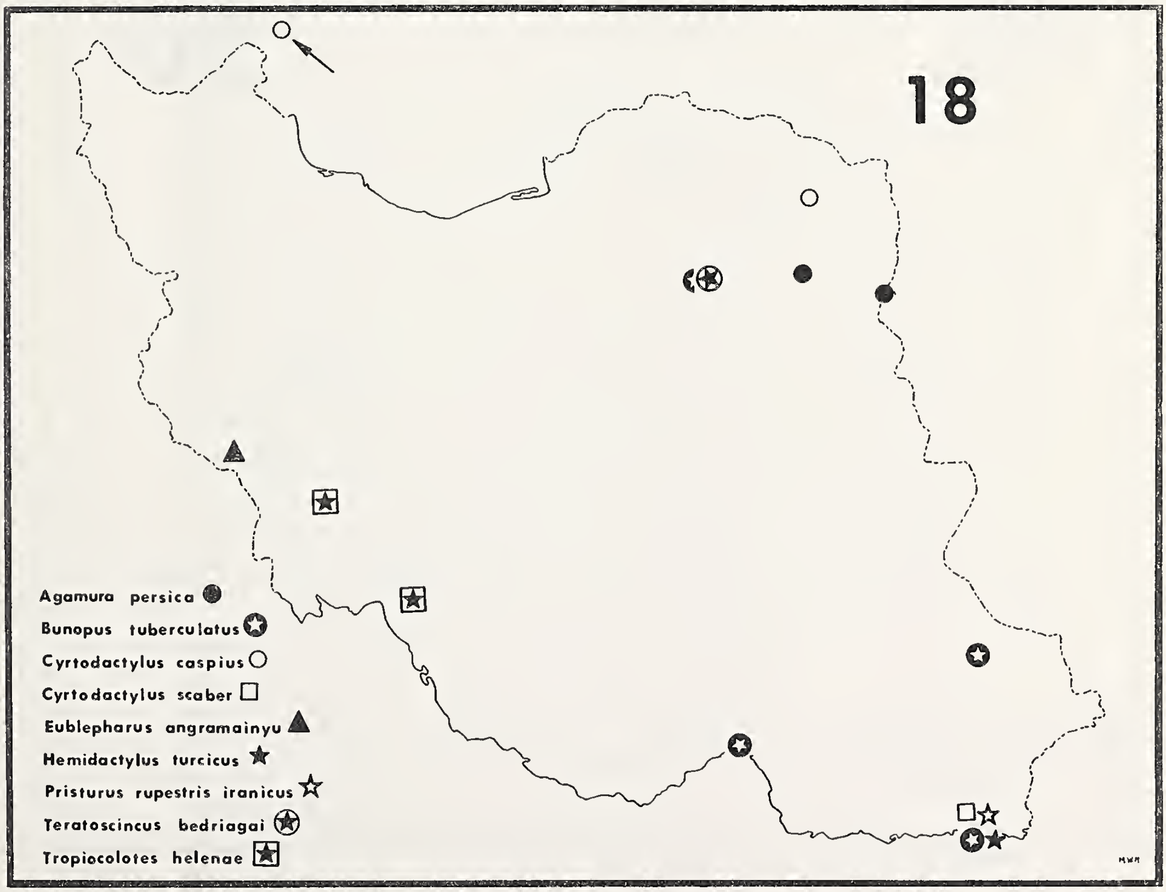
Anguis fragilis colchicus ●
Ophisaurus apodus ✪
Varanus griseus ○
MWM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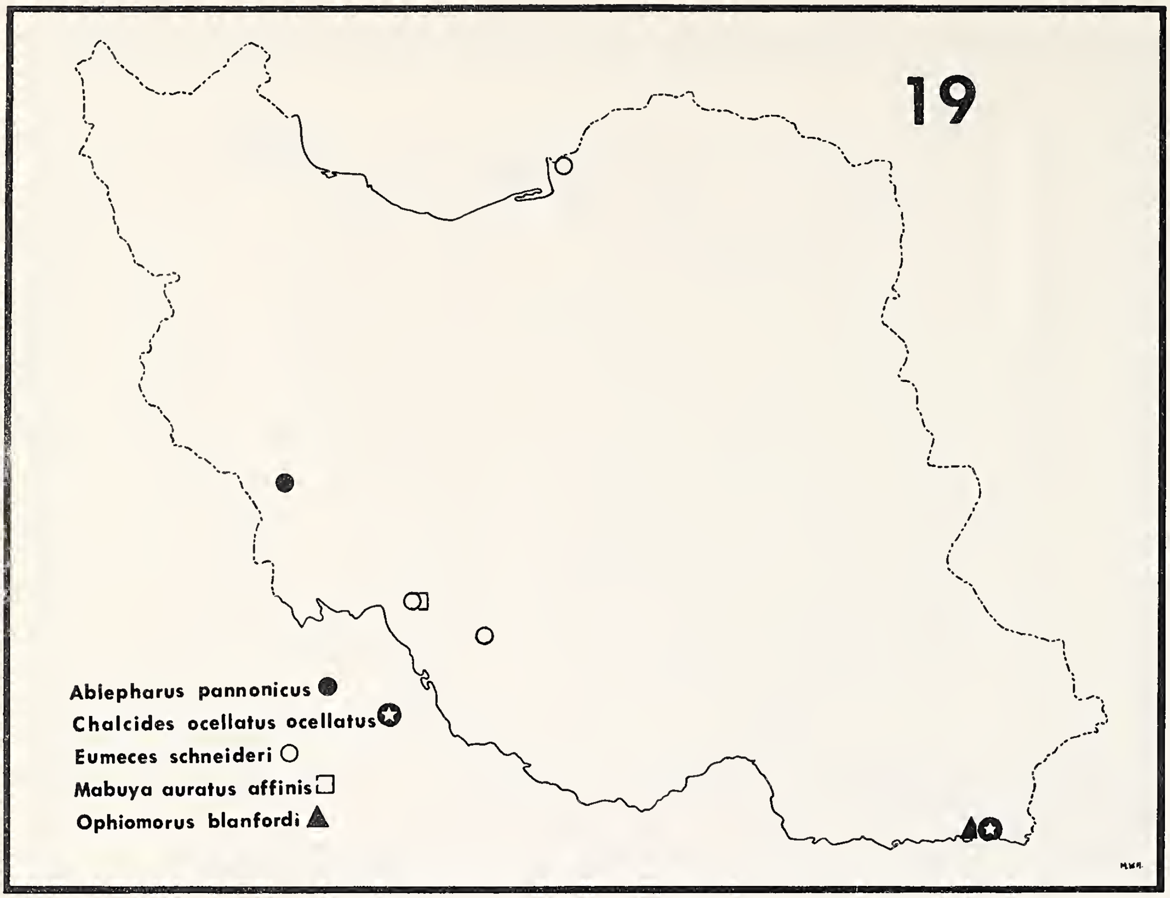
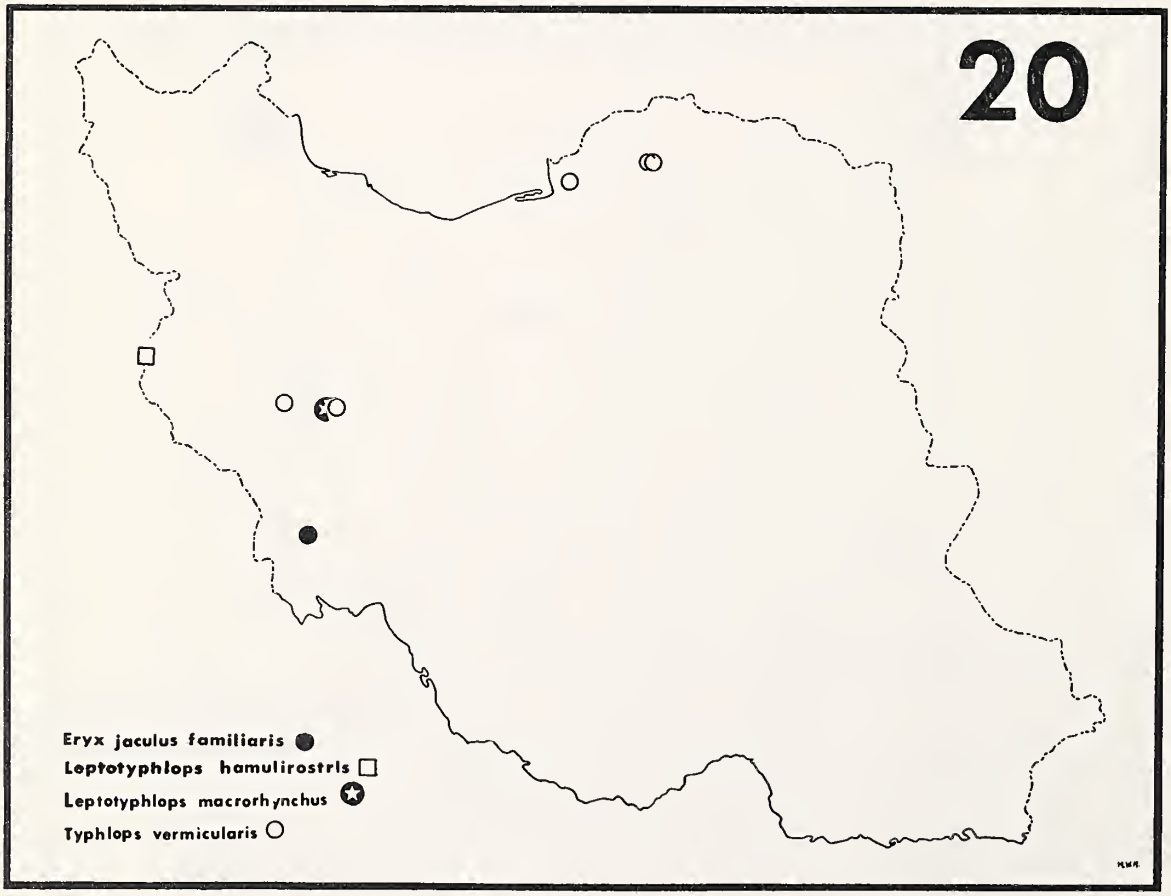
Agamura persica ●
Bunopus tuberculatus ✪
Cyrtodactylus caspius ○
Cyrtodactylus scaber □
Eublepharus angramainyu ▲
Hemidactylus turcicus ★
Pristurus rupestris iranicus ☆
Teratoscincus bedriagai ⊛
Tropiocolotes helenae ▣
MWM


19
Ablepharus pannonicus ●
Chalcides ocellatus ocellatus ✪
Eumeces schneideri ○
Mabuya auratus affinis ☐
Ophiomorus blanfordi ▲
M.W.R.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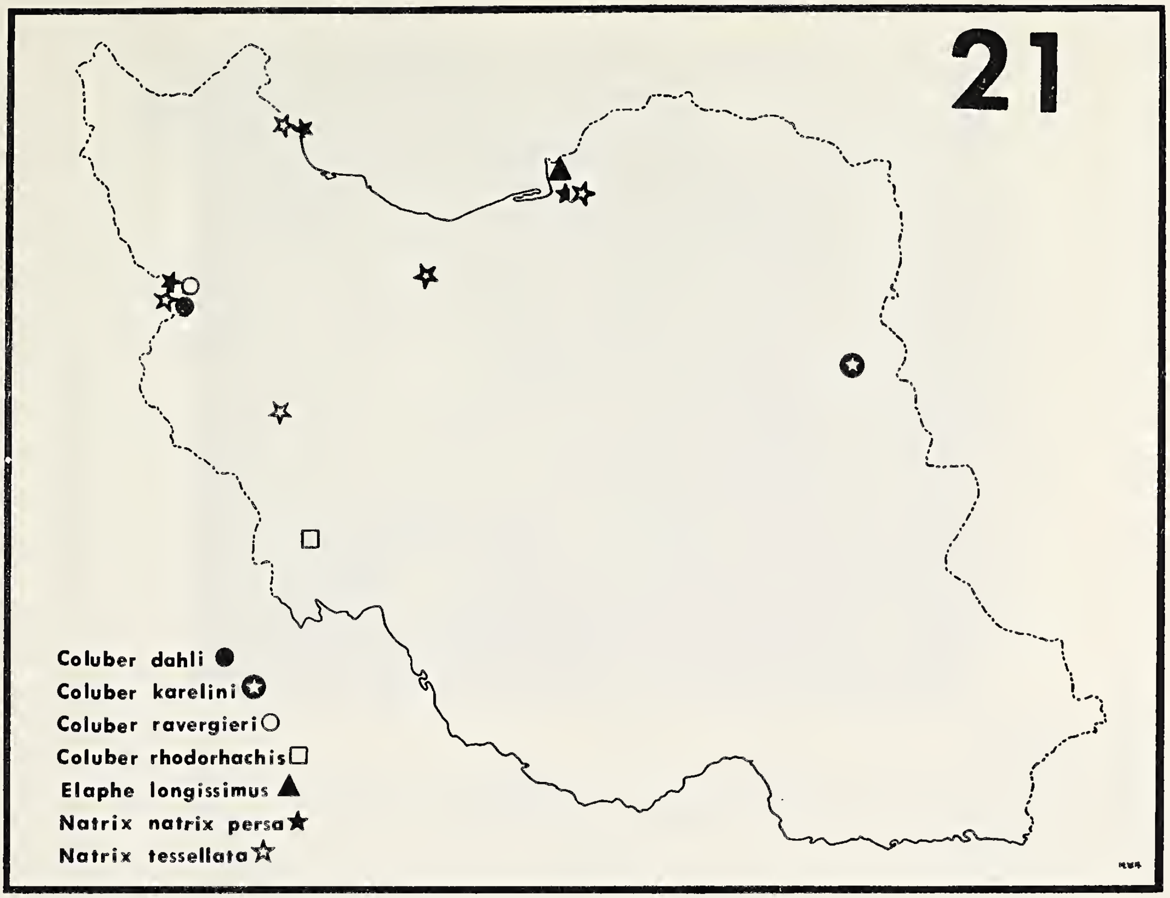
Eryx jaculus familiaris ●
Leptotyphlops hamulirostris ☐
Leptotyphlops macrorhynchus ✪
Typhlops vermicularis ○
M.W.R.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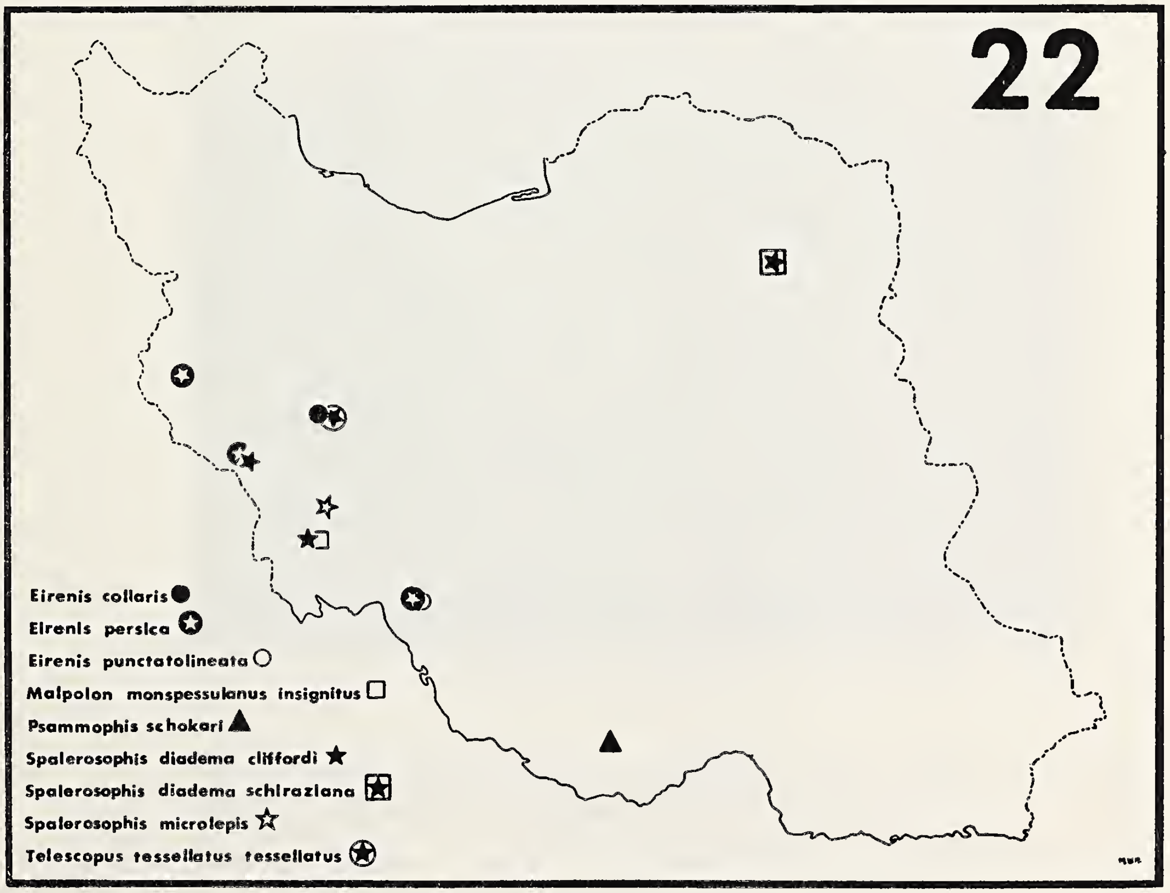
Coluber dahli ●
Coluber karelini ✪
Coluber ravergieri ○
Coluber rhodorhachis ☐
Elaphe longissimus ▲
Natrix natrix persa ★
Natrix tessellata ☆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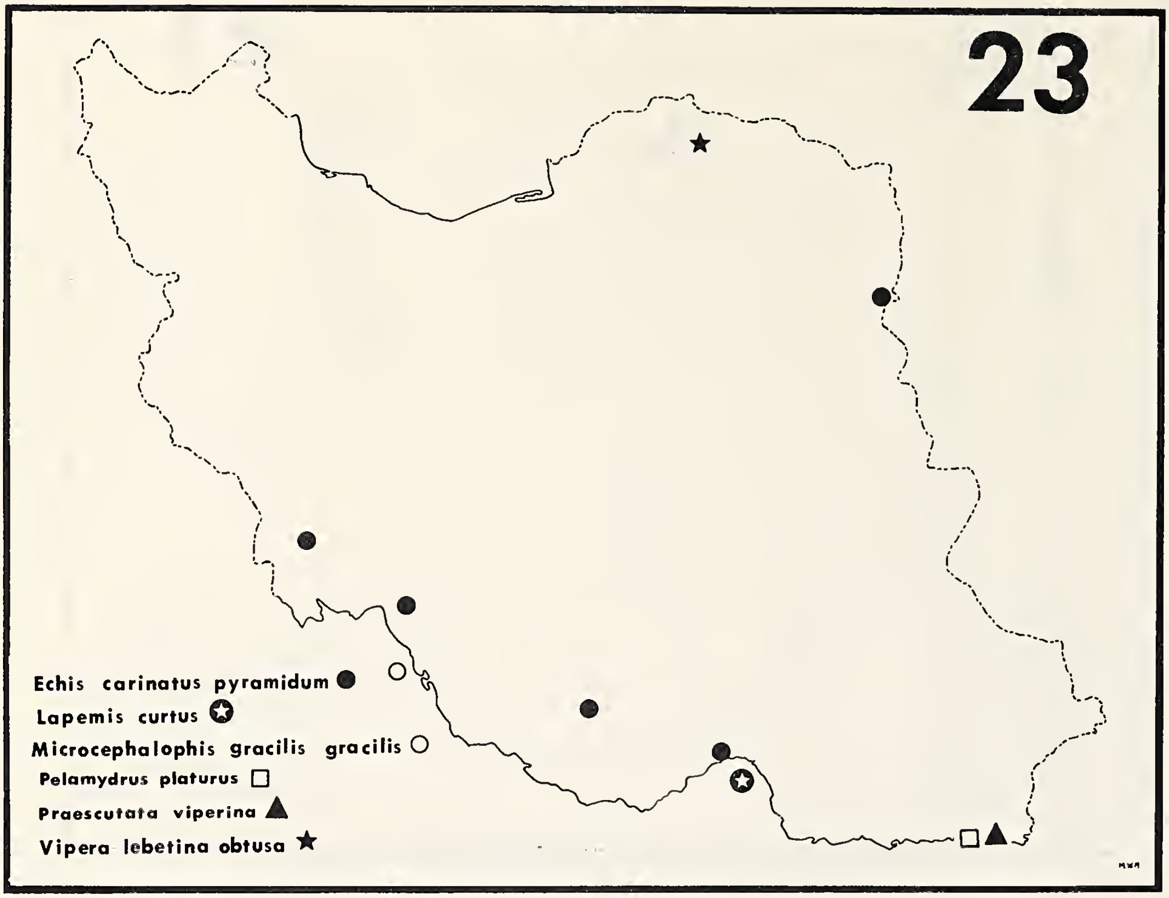
Eirenis collaris ●
Eirenis persica ✪
Eirenis punctatolineata ○
Malpolon monspessulanus insignitus ☐
Psammophis schokari ▲
Spalerosophis diadema cliffordi ★
Spalerosophis diadema schiraziana ⯀
Spalerosophis microlepis ☆
Telescopus tessellatus tessellatus ✪



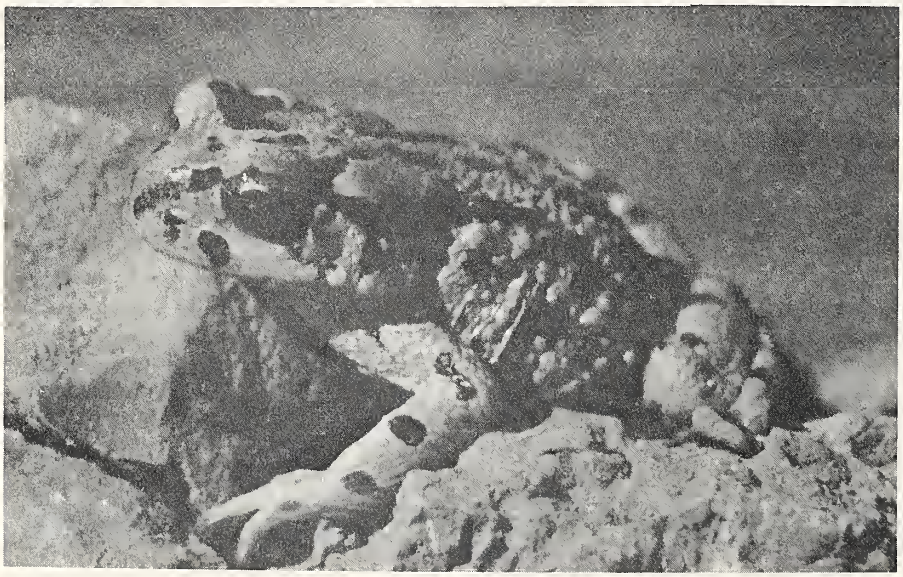


Fig. 1. *Bufo viridis arabicus*, one of series USNM 153436-40, 1 km. N. Takht-e Jamshid (Persepolis), Fars Province, Iran, 27 Nov. 1963.

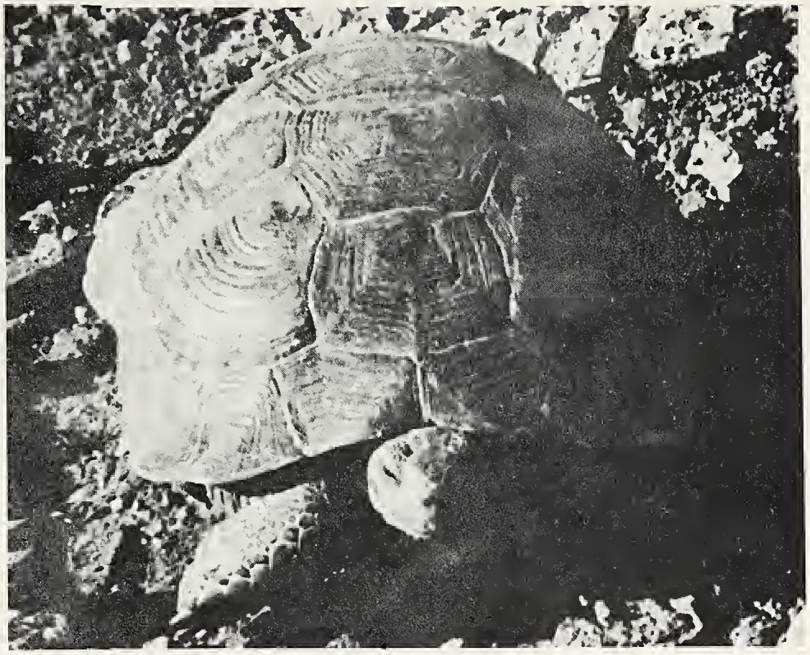


Fig. 2. *Testudo zarudnyi*, not collected, 74 km. NW Najafabad, Esfahan Province, Iran, 14 May 1964.

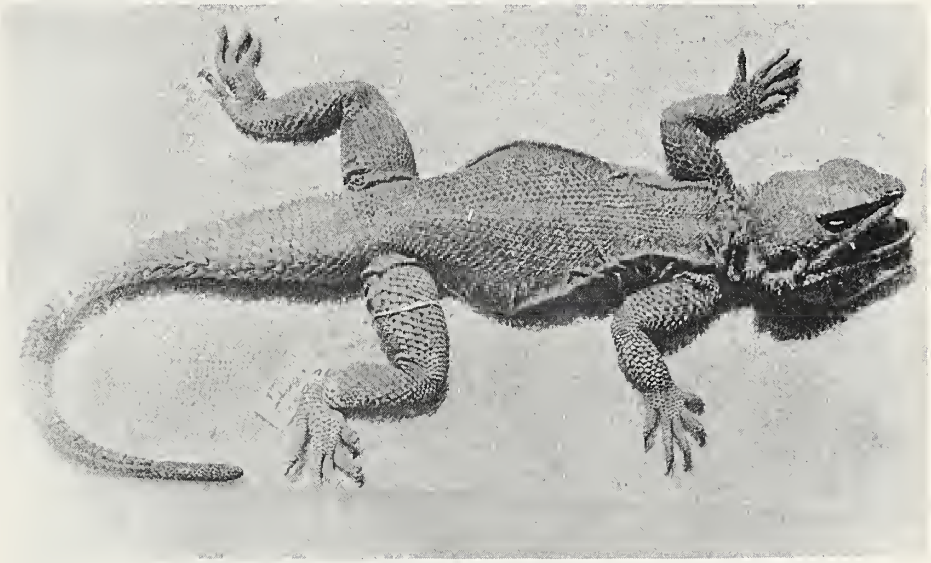


Fig. 3. [dorsum]: *Agama nupta*, USNM 153732, 50 km. SW Borujerd, Khuzistan Province, Iran, 27 Apr. 1964.

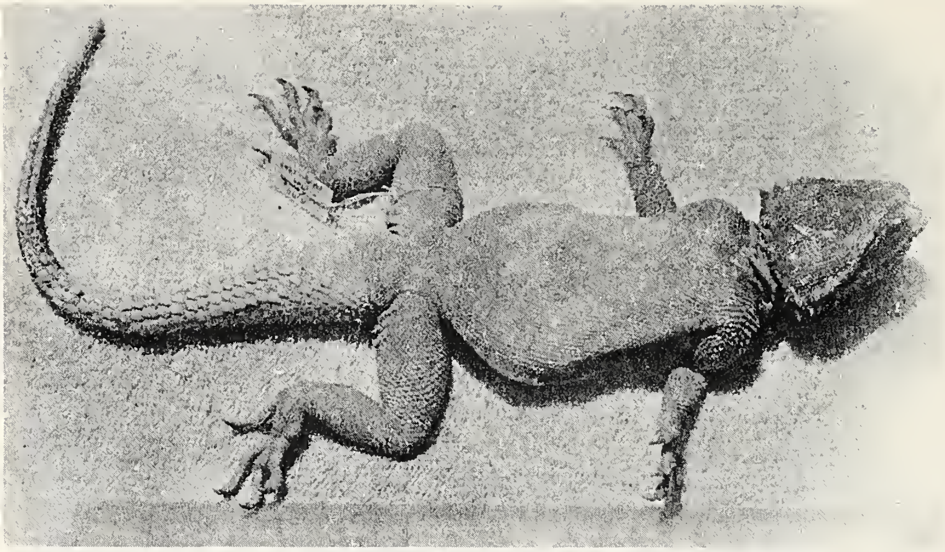


Fig. 4. [venter]: *Agama nupta*, USNM 153732, 50 km. SW Borujerd, Khuzistan Province, Iran, 27 Apr 1964.

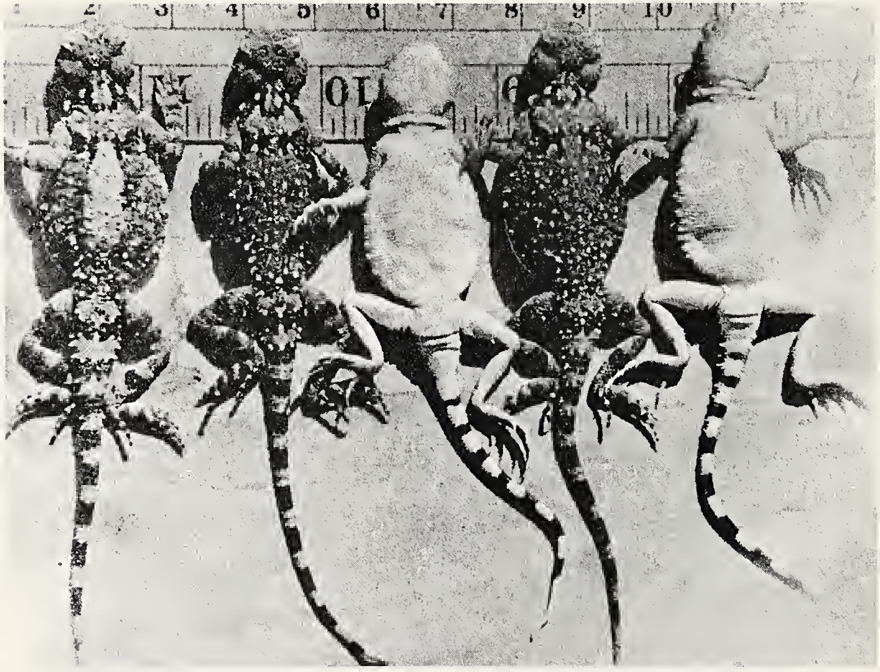


Fig. 5. *Phrynocephalus scutellatus*, part of series USNM 159343-57, 5 km. W. 'Abbasabad, Mazanderan Province, Iran, 9 Nov. 1964.

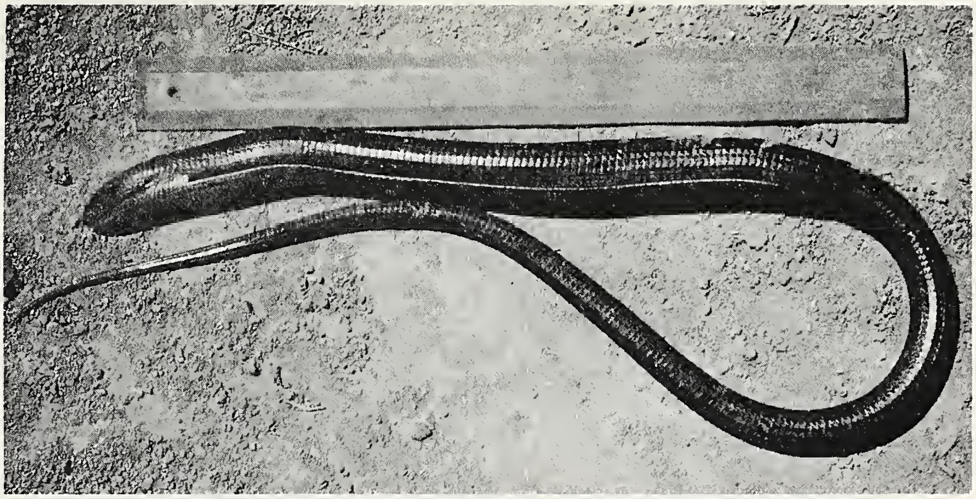


Fig. 6. *Ophisaurus apodus,* USNM 154489, 159 km. W. Bojnurd, Mazanderan Province, Iran, 12 June 1964.

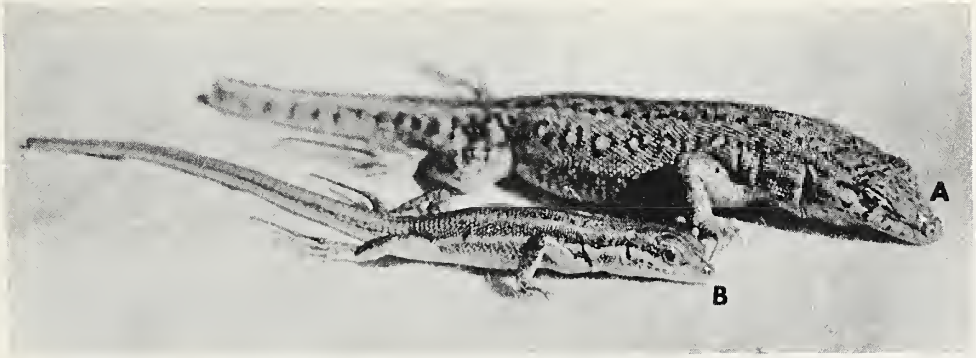


Fig. 7. A (top), *Eremias guttulata watsonana,* USNM 153593, and B (bottom), *Ophisops elegans elegans,* USNM 153594, 1 km. N. Takht-e Jamshid (Persepolis), Fars Province, Iran, 27 Nov. 1963.

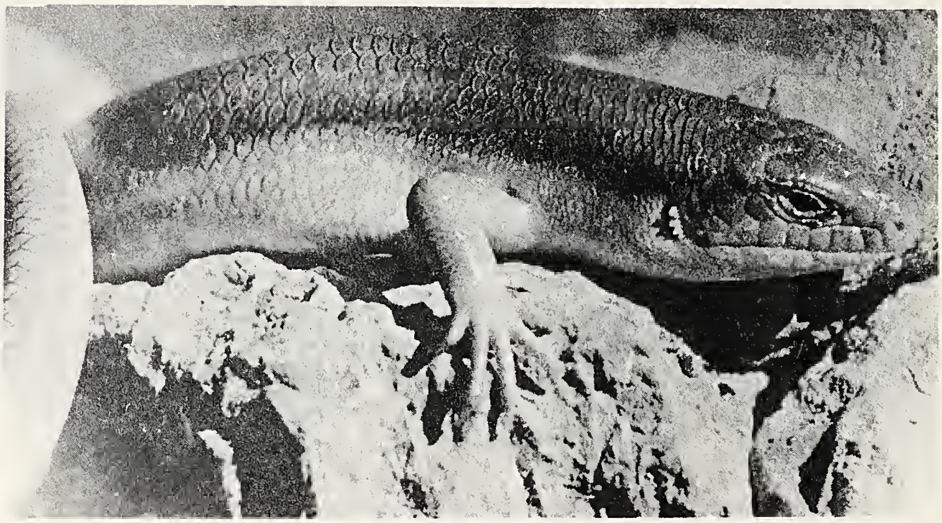


Fig. 8. *Eumeces schneideri*, USNM 153595, 38 km. W. Shiraz, Fars Province, Iran, 23 Nov. 1963.

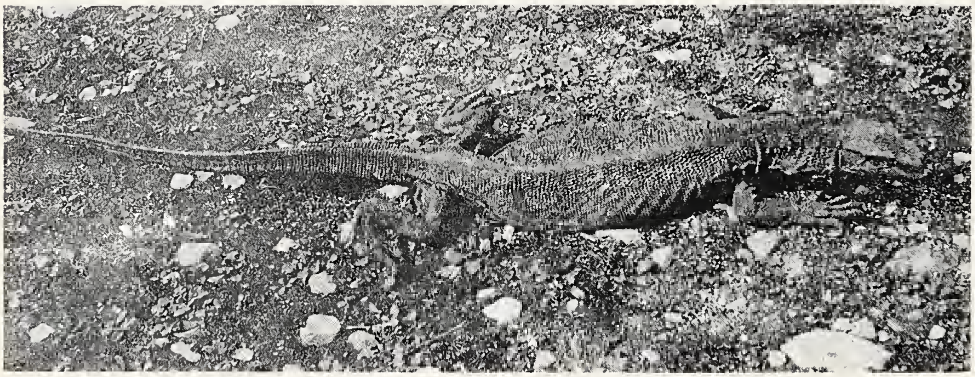


Fig. 9. *Varanus griseus*, USNM 160302, 35 km. E. Gachsaran, Khuzistan Province, Iran, 11 Feb. 1964.

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R G TUCK, JR
JAN 3 1972

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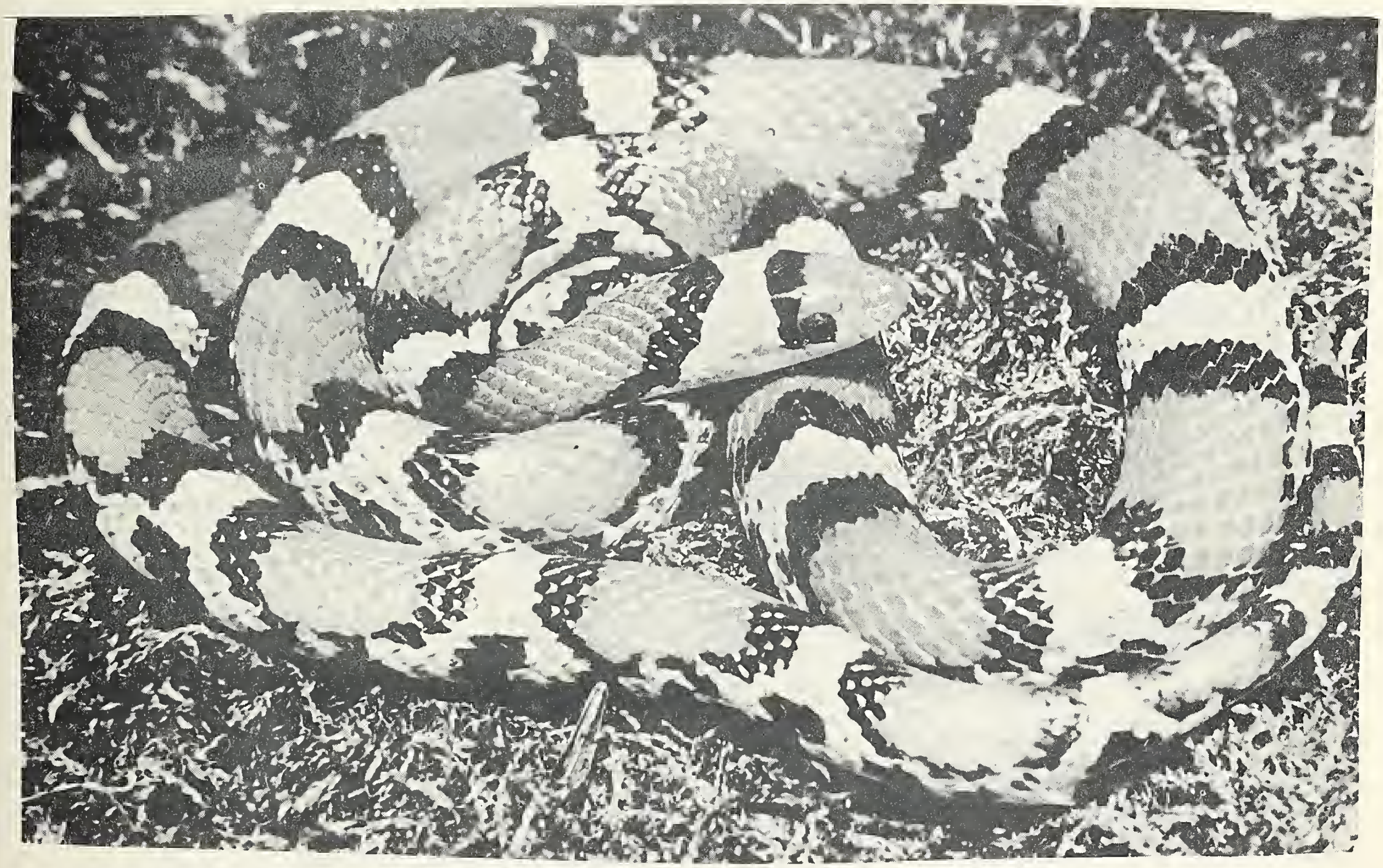

DECEMBER 1971 VOLUME 7 , NUMBER 4

Bulletin of the Maryland Herpetological Society
Volume 7 Number 4 December 1971

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The Cover: An adult *Cemophora coccinea* from near Gainesville, Florida. Photograph by Dr. Robert S. Simmons.

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The Maryland Herpetological Society, Department of Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

BULLETIN OF THE
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Volume 7 Number 4 December 1971

The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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SUBSPECIES - HANDLE OR HOBBLE?

The use of the trinomial in herpetological taxonomy is a time-honored tradition that helps to occupy the time and energies of numerous people. The avid pursuit of populations with an average distinction or two which can be used to justify a name, the field work involved in verifying these populations and establishing their precise boundaries, and the biolegal technicalities of establishing priorities and what-not, are all enjoyable ways to spend one's time, much better that bowling or shooting pool for the herpetological enthusiast. In view of the time and energy that is poured into these pursuits, I feel it perhaps pertinent (if irreverent) to take a moment to ask a simple question of the whole issue: "Just what," I ask, "is the information content of the trinomial application?" Just what do we know or convey about a given subdivision of a genetic complex by the awareness of, or assignment of, its subspecific status? Have we deepened our understanding of the evolutionary position of a population or the selective pressures to which it is subject? Are we in a better position to predict the evolutionary progress of the species as a unit, or a diversity of units? Or have we, claiming to be practical, just cluttered the literature a bit to create a convenient "handle" for our future references to some specific fragment of a wide-ranging species population? If the latter, can we really justify the verbage utilized in our description as a time, labor, or space-saving maneuver?

Classically, the subspecies application was used by surprised typologists when they discovered that some populations of their "species" did not fit their typological stereotype. Their view of a "species" as a relatively homogeneous, invariant, "type", resulted in, or produced ,a mental set where differences between populations were not to be taken lightly. Such differences were obvious examples of evolution-in-action and these definably distinct populations were considered as "incipient species". Of course, recognition of such momentous discoveries was part of the work of the evolutionary biologist and an achievment of note when successful. But that was in biology's classic period; what about today, is such an attitude justified in the era of a "biological" species concept?

Today we view a "species" with a greater tolerance of variability, a greater dependence on our knowledge of its genetic relationships with other forms and less on its resemblance to some abstract concept of the "type", or what it "should" look like (interested readers are referred to Simpson's, "Principals of Animal Taxonomy" for a detailed discussion of all of this). We know, or should, that animals vary quite a bit, both locally and geographically. Our modern concepts of population genetics tell us that the probability of different populations within a "species" having somewhat different average genetic compositions is quite high - that distance, different ecologies, short periods of separation, and random chance, all operate to increase differences between populations. It tells us that we should - to reduce an impressive body of knowledge to its barest essentials - expect genetic differences, and thus, frequently, observable differences, between populations rather than be surprised at them.

This shift in emphasis should certainly affect the value we place on the discovery of average statistical measured differences between populations. We should also bear in mind a few other miscellaneous observations. Foremost of these, I feel, is that only a small percent of the genetic characteristics of a population will be reflected in gross, measurable (at least by standard herpetological methodology) morphological characteristics. Thus, animals may vary considerably without our awareness. They may differ in biochemistry, physiology, behavior, and what-not, and still "look" the same. Only a fraction of the total intraspecific variability is generally available to us for scrutiny and we must temper our judgements with the knowledge that we see only a small (tiny?) part of the picture. Because of this our whole subspecific taxonomy is based on gross, average, physical differences between populations and not on any "real" idea of their over-all similarity or difference. Is it more significant to find an average difference in color pattern or number of ventrals than the possible similarities or differences in, say, basic physiology - water balance, temperature tolerance, etc.? Our present system, I feel, gives undue importance to the eye-catching, superficial, characteristics which are easily measured. This tiny fragment we view is also too often compounded with sample size inadequacies. Often, if not usually, subspecific recognition is given a population based on only a handful of specimens, or even less. We would scoff at a paper purporting to analysize "variability" within a population based on such sample sizes but readily accept slight average differences based on inadequate samples when dealing with a potentially "namable" population. We let, I think, our preconceptions of ecological or geographic factors unduly weigh our evaluation of the differences we may find. Knowing a population is or has been isolated from the rest of the species certainly seems to prime some workers to anticipate differences and to immortalize these differences with a name of their own, even though in many cases, these differences are scarcely, if any, more impressive than the average differences to be found between populations in the main range of the species, or even, in extreme cases, between specimens from the same population! The subspecies is an "average" concept - that is, the populations are judged to differ in some character to some arbitrary average degree, usually between 65% and 80%. Thus, even in ideal situations, not all specimens from two different subspecies can be distinguished. If only a few, say less than 20 from each important locality, specimens are available, the chances of accurately measuring these average values are scant indeed. When we have only a few specimens we tend to be overly impressed by the "oddballs" and can thus wind up with a completely erroneous idea of what our "new" population actually looks like on the average.

Additionally, we should be concerned with the components of variability that are not accurate reflections of basic genetic differences - with the degree to which accidental, or variable, environmental factors may affect the characteristics we measure.

A mere difference in appearance does not necessarily indicate a difference in genetics - and genes are what we really claim to be talking about when we talk about differences between animals. One of the standard measures in studies of snake subspecies, the number of ventral scales, has been shown to be susceptible to differences in developmental temperature /for example,/ specimens hatched from eggs incubated in the laboratory at higher temperatures tend to have a higher number of ventrals - a standard measure for defining subspecies. In the West a similar difference is frequently seen in species where some populations live in more open, exposed, and hotter, habitats. While we don't know that this is not just a coincidence and we can't yet say that these populations do not in fact differ genetically for the ventral count, we also cannot argue the opposite - we simply do not know what environmental conditions may be often affecting the characteristics we measure, over and above any genetic factors.

This is a whole, almost untouched, realm in herpetological taxonomy and seems to me to take precidence over the simple description of interpopulation differences. Before, or at least while, we expend energy, time, and page space, in describing population differences we should be making some attempt to determine their underlying causative factors!

Or do we primarily claim to be pragmaticists - describing different appearing subdivisions within a species simply as a form of shorthand while admitting all of the above objections? I don't think this position can be justified pragmatically, and I think few professional herpetologists would attempt to (the Newsletter of this society will offer them a starting point if they should be so inclined). "Striped rat snake" is certainly no more cumbersome than "*Elaphe obsoleta quadravittata.*" It certainly involves considerably less preliminary verbage, as well as avoiding much potential formal taxonomic debate over correct nomenclatorial assignment and procedures, etc.. Informal adjectival reference can be as informative as any trinomial and possibly a good deal less wordy. Those who doubt that a species can be analyzed geographically without recourse to subspecific allocations should read Savage & Heyer (1967) concerning the frog *Phyllomedusa callidryas* in Central America. When they have finished, if they are diligent, they will have an excellent picture of the geographic variability of the species without once being required to commit a new name to memory! In this paper the variability in color and form within the species is described and analyzed in an attempt to understand the biological pressures and influences affecting it and not just as a peg to hang a new name on.

I'm not prepared to extend these arguments to a complete rejection of the use of the trinomial for I feel the trinomial usage still has some function in the scientific literature. There are populations, I feel, for which the trinomial is "justified", though my emphasis on its usage is 180° out of phase with the current usage. I feel that, for a time at least, the subspecies can and should function to indicate genetic continuity between populations, rather than genetic differences between them. The average differences we can expect from our knowledge of population genetics in most cases, but in some, the continuity may come as a surprise. Thus, someone with a "blotched" and a "striped" and a "black" rat snake in hand may be surprised to learn that they are merely geographic variants of the same species - and he could learn this quickly through awareness of their subspecies status. In this case the superficial differences could easily obscure the true genetic relationships between the different-appearing population. The "Coastal Plain Milksnake" might be taken as a contrary example. This "subspecies" represents, obviously to anyone willing to look beyond their own backyard, a transition from the dull brown "milksnake" of the north to the brilliant "scarlet king" of the south. As we go from north to south in this transition zone the color brightens, browns turn to red, greys to white, the dorsal blotches move downward and around the belly and the lateral blotches become surpressed, then disappear. This is a fascinating process and one worthy of study, but what is an "average" characteristic for a population that displays such dramatic change over a zone of a couple of hundred miles? Can we fit an "average" description that will hold for populations from New Jersey and Virginia? Should we bother? Or should we recognize the process for what it is and attempt to study it to determine the factors responsible for such a dramatic shift in emphasis and not dissipate our energies arguing over what the "average" characteristics are - over what defines the "subspecies"? Does applying a subspecific name to this intermediate zone really help us understand, or does it obscure the issue by implying that here with the milksnakes we have the same sort of relationship that we have with the rat snakes? In the 1st case the trinomial carries information pertinent to the receiver, in the 2nd the trinomial may actually confuse the issue by implying a greater difference than actually exists, or by diverting interest from the real issues, the factors responsible for this transition. This is one of the clearer examples of a situation where our preoccupation with the "handle" might "hobble" our thinking about the more important underlying biological questions.

In summary, I submit that the use of subspecies terminology to define populations which are only distinguishable on average differences constitutes a "hobble" on our thinking about the underlying ecological factors influencing these differences and that this practice should be discontinued, or at least discouraged, forthwith. The trinomial is useful as an indicator of genetic continuity where none might be expected, particularilv where such a relationship is historically denied. When two "subspecies" have been previously recognized as distinct species, based on subjectively dramatic, superficial, morphological differences its use might be tolerated for a period to allow adjustment of the thinking of the older generations of biologists to any startling reassessments of genetic relationships. But it should be limited to this function. Such a reassessment of priorities would allocate more time and energy to the understanding of biological variability and less time to the now trite documentation of its existence.

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—— Howard W. Campbell, *Florida State Museum, Gainesville, Florida*

Received 8 April 1971

ALBINISM IN THE NORTHERN PINE SNAKE, *PITUOPHIS MELANOLEUCUS MELANOLEUCUS*

Albinism in the gopher snake subspecies of *Pituophis* occuring in Arizona and California (especially around San Diego) have been reported numerous times (Hensley, 1959; Kessel and Leviton, 1958; Klauber, 1947). It is the purpose of this note to report on partial albinism in the northern pine snake, *Pituophis melanoleucus melanoleucus* for which this is apparently the first report.

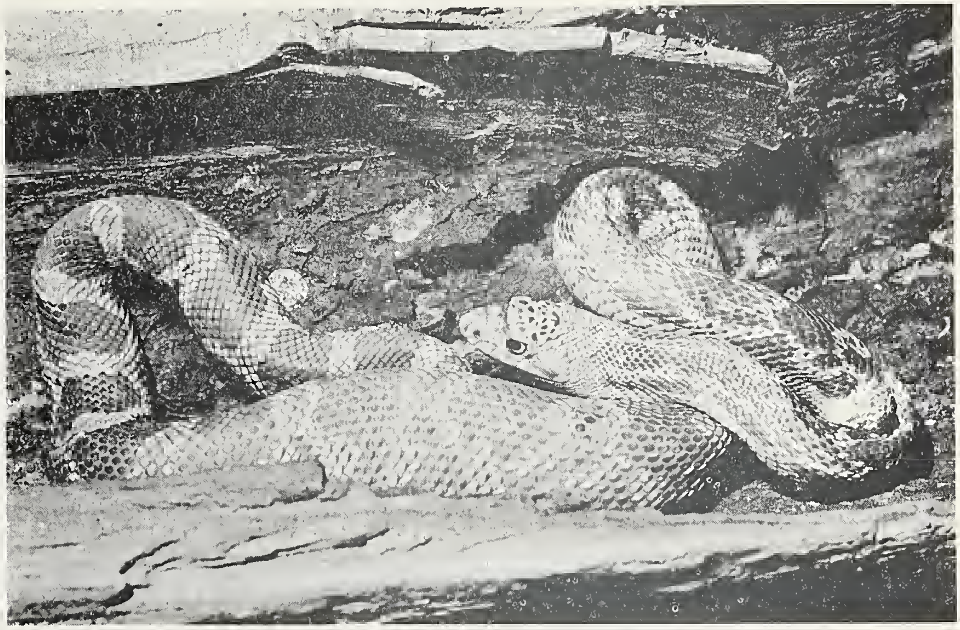

Figure 1. An albinistic northern pine snake. (Photograph by R.G. Tuck, Jr.)

Two partial albino pine snakes were hatched from eggs of a normal female, which was collected about fifty miles north of Atlanta, Georgia in Pickens County. Eight eggs were laid on 1 July 1970. During the third week of September, seven of these hatched, including the two partial albinos. The eggs measured approximately 1 1/2 inches in diameter and 2 1/2 inches in length. At hatching, the snakes' bodies were bulging, suggesting rapid yolk absorption toward the end of incubation. The normal hatchlings had a pinkish tinge, which faded about a week after hatching.

From photographs and a written description, Max Hensley (1970) of Michigan State University judged these specimens to be partial albinos. They show markedly reduced concentrations of melanin. Areas in the normal snakes which are blackest appear in the albino as a waxy pale slate. These blotches are lined by a thin border of reddish-brown, and the ground color is a pinkish sandy beige. The tongues are pink and the pupils of the eyes are maroonish black, suggesting the presence of melanin. One has a truer pink ground color, while the other shows tendencies toward reddish brown.

A breeding experiment with an albino gopher snake at the San Diego Zoo (Klauber, 1947), and extensive breeding of albino corn snakes, *Elaphe guttata*, at the Baltimore Zoo (Groves, 1965, 1969) indicate that the responsible gene is a single recessive. The albinos lag a little behind the normal specimens as far as eagerness to eat, but this has resulted only in a slightly slower growth rate. Since hatching, these snakes have fed entirely on full grown mice. As of the submission of this article, 15 May 1971, the snakes are doing well in captivity, and plans are underway to initiate a breeding experiment to help confirm the operation of the albinistic gene.

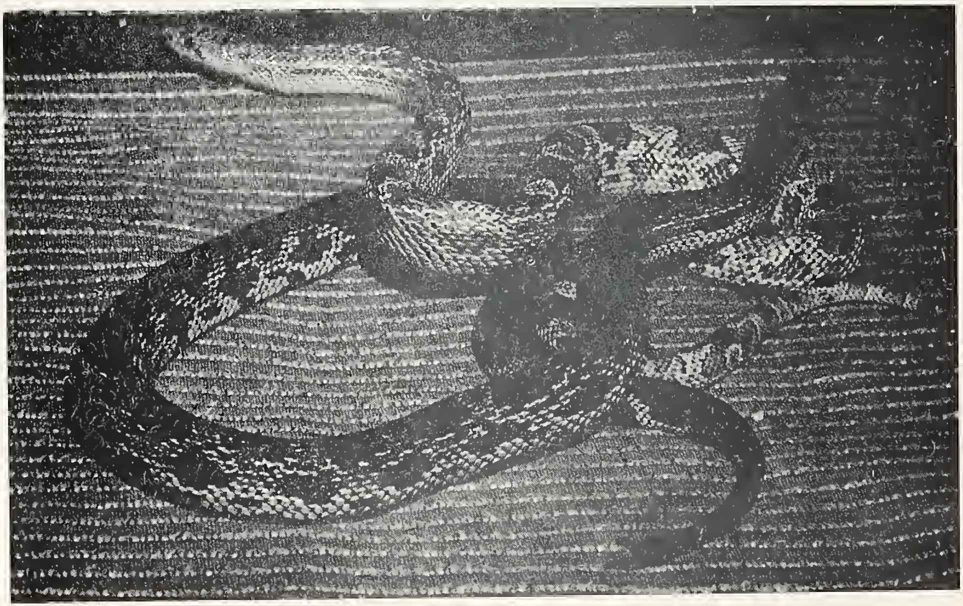

Figure 2. An albinistic northern pine snake with a normal sibling for comparison. The specimen shown here is lighter then the one in fig. 1. (Photograph by R.G. Tuck, Jr.)

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——George F. Cresswell, *4307 Bradley Lane, Chevy Chase, Maryland 20015*.

Received 17 May 1971

Humidity as a Growth Factor in Hatchlings of *Clemmys muhlenbergi*

The growth of three Bog turtles (A,B,C.) which hatched the last week of July 1970 was recorded over the ten months from 1 August 1970 through 31 May 1971. During the five months from 1 August 1970 through 31 December 1970 the humidity in the turtles' enclosure was uncontrolled and usually ranged from 45 to 65%; in the five months from 1 January 1971 through 31 May 1971 the humidity in the enclosure was maintained at 95 to 100%. This was done by covering the enclosure almost completely with Saran Wrap, leaving open only a very small space for exchange of gases. The humidity was measured with a small gauge which was kept in with the turtles at all times.

Other factors were constant except the temperature which increased from 74° to 78° F. as a result of closing off the top. The diet consisted of the following: mealworms, earthworms, lean stew beef, chicken entrails, and Wardley's Sturdee Shell, a commercial turtle food with a high protein content. The meats and earthworms were chopped to a size easily accommodated by the young turtles and then thoroughly mixed with liberal amounts of bone meal and Pre-natal Theralin (a very good vitamin supplement intended for dogs). Each time the water was changed a 50 mg. tablet of ascorbic acid was dissolved in the clean water and numerous Plaster of Paris chips were dropped in as a calcium source. The turtles were frequently observed eating these chips.

Under the same conditions as were used through 31 December 1970 five *Clemmys guttata* hatchlings grew to lengths of from 57 to 65 mm. in a six month period; it was therefore expected at first that the *C. muhlenbergi* would fare as well. As can be seen in the accompanying growth charts, the increase in size was disappointing over the first five months. During the fifth month a series of young Bog turtles which had hatched approximately the same time as the author's, in a colleaque's collection were observed. These specimens were 3 to 5 mm. larger than the three turtles used in this study. The only significant difference in the care received by the other collection was that they were kept in a covered aquarium rather than one with an open top. Not having sufficient young turtles to set up a valid control group experiment, it was decided to put all three *muhlenbergi* into a high humidity environment and simply observe any change in the growth pattern.

The dramatic increase in the growth rate, which occurred after a very short initial adjustment period to the new "climate" is evident in the charts below. Some of the increase may be due to a rebound effect caused by the slow growth in the first half of the study, but the tremendous growth throughout the period cannot all be attributed to that. The slowing of growth in the latter months is understandable when one considers the fact that these specimens have now reached a full half or more of the average adult size of the species -- and this in just ten months. (NOTE: all measurements and data are based on straight carapace lengths)

Carapace Length (mm.)

	A	B	C
At hatching	24.0	25.5	26.0
31 December 1970	27.0	29.0	32.0
31 May 1970	51.0	53.0	58.0

Monthly Growth 1 Jan.-31 May 1971 (mm.)

	A	B	C
Jan.	6	6	7
Feb.	8	6	8
Mar.	3	6	4
Apr.	4	4	4
May	3	2	3

Net Increase in Carapace Length (mm.) (per period)				Per cent. Increase in Carapace Length (per period)		
A	B	C		A	B	C
3.0	3.5	6.0	1 Aug. 1970-31 Dec. 1970	12.5	13.7	23.0
24.0	24.0	26.0	1 Jan. 1971-31 May 1971	89.0	82.8	81.3
27.0	27.5	32.0	1 Aug. 1970-31 May 1971	112.5	107.8	123.0

— William H. Zovickian, *U.S. Army Dental Company, Fort Carson, COLO. 80913.*

Received 30 June 1971

The First Record of the Corn Snake, *Elaphe guttata guttata*, from West Virginia

The known distribution of the corn snake *Elaphe guttata guttata* was recently extended into the Valley and Ridge Section of Maryland's Appalachian Province, where a specimen was taken from Washington County (Norden, 1971). Previously, the range of this snake in Maryland was thought to be Coastal Plain. Numerous localities from Virginia (Norden, 1971) indicate that this species has been collected more in the Appalachian, Blue Ridge and Piedmont Provinces (15 localities) than in the Coastal Plain Provinces (2 localities) of that state.

On 16 May 1971, an adult male corn snake approximately 48" was taken just NW of Orleans Cross Roads on the B & O Railroad bed along the Potomac River, Morgan County, West Virginia. This specimen was collected by Kenneth L. Grove and presented to me by his son Mike, one of my biology students. This appears to be the first record of the corn snake from West Virginia, as a review of the literature (Green, 1961) fails to indicate its presence from that state. The specimen is catalogued R1736NHSM in the collection of the Natural History Society of Maryland.

This specimen was taken approximately 5 miles SW of the record from Washington County, Maryland, and helps fill the gap between that specimen and the record from Stephens City, Frederick County, Virginia, 35 miles to the South. Undoubtedly, further collecting will reveal additional specimens from West Virginia as well as the western portion of Maryland. It is not too unrealistic to expect the presence of this species in Pennsylvania, as the Washington County specimen is within 10 miles of that state.

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A corn snake, *Elaphe guttata guttata,* from Western Maryland. *Bull. Md. Herp. Soc.,* 7 (1): 25-27.

— William L. Grogan, Jr., *532 Prince Charles Ave., Odenton, Maryland.*

Received 4 June 1971

Editor's Note:

Today (1 Sept. 1971) Mr. Grogan informed me of an additional specimen of *Elaphe g. guttata* from West Virginia. It was collected 27 August 1971, just south of the reported locality by Mike Grove..... an adult male, 47.5 inches in total length, presently alive in Mr. Grogan's care.

Two additional Maryland specimens from this immediate area are also at hand (See Bull. Md. Herp. Soc., 7 (1): 25-27) The first was found DOR, 18 Sept. 1971 at Little Orleans, Washington Co., Maryland by Mark Tegges (RS785HSH). The second specimen (RS786HSH) is represented by a skin which was taken from a specimen killed on 26 or 27 June 1971 at the Strause Explorer Base Camp, Washington Co., Md. (Both Md. specimens are preserved in the editor's collection.) H.S.H.

NOTES ON PILOT BLACKSNAKE (*ELAPHE OBSOLETA OBSOLETA*) (SERPENTES: COLUBRIDAE) EGGS AND HATCHLINGS

Fitch (1970) summarized available information on egg laying, clutch size, and hatching in squamate reptiles. Data presented for pilot blacksnakes, *Elaphe obsoleta,*

TABLE I

Egg: (No.)	Length (mm)	Width (mm)	Day Slit	Day Hatched	Hatchling; Total Length (mm)	Snout-Vent Length (mm)	Mass (g)
1	45.1	29.9	30 Aug	30 Aug	346	284	10.3
2	41.8	28.8	30 Aug	30 Aug	327	274	9.4
3	39.6	30.2	30 Aug	31 Aug	340	284	11.3
4	42.7	29.3	30 Aug	31 Aug	352	295	11.2
5	39.2	38.4	30 Aug	31 Aug	344	283	11.1
6	38.9	29.1	30 Aug	1 Sep	334	278	11.2
7	46.0	29.4	31 Aug	1 Sep	340	286	10.9
8	40.6	29.2	30 Aug	1 Sep	332	278	10.7
9	38.0	31.7	31 Aug	2 Sep	336	283	10.5
10	38.6	31.6	1 Sep	2 Sep	335	281	11.1
11	44.7	39.5	31 Aug	2 Sep	348	294	11.9
12	38.3	29.7	31 Aug	2 Sep	349	288	11.4
13	38.6	31.6	2 Sep	3 Sep	336	280	11.6
14	37.7	31.4	3 Sep	4 Sep	357	301	10.7
15	35.0	29.7	dead fetus		-	-	-

were essentially those given in his (1963) work on this species' life history, as well as those extracted from Wright and Wright (1957). Reports on sizes of *E. obsoleta* eggs and on lengths and weights (e.g., masses) of hatchlings are meagre. Such information, when given, consists of listing ranges and means. Lynch (1966) gave no measurements for 76 eggs believed deposited communally, nor for 68 young hatched from them. McCauley (1945) reported measurement ranges for a 13-egg clutch and cited averages for two other groups. Schmidt and Davis (1941) stated approximate dimensions of pilot blacksnake eggs and average hatchling length. Slack (1944) averaged sizes of 10 eggs and of six hatchlings produced. Smith (1956) mentioned length and width ranges for *E. obsoleta* eggs but did not include hatchling data.

One of us (Ferris) recovered 15 pilot blacksnake eggs deposited together in sawdust at Mason Neck National Wildlife Refuge, Fairfax County, Virginia 16 August 1970. Each egg was marked, measured along major and minor axes, buried in moist sawdust within a covered metal container, and maintained at 20° C - 22° C by the senior author. Fourteen hatched successfully, beginning 30 August and continuing through 4 September. One fully developed, albeit dead, fetus was preserved in the National Collection of Reptiles and Amphibians as USNM167619. All hatchlings, ventral scutes clipped for future recognition, were released at collecting site 5 September.

Least squares regression analysis of hatchling snout-vent length (Y) as function of total length (X) yield regression formula $Y = 3.37 + 0.83X$ and linear correlation coefficient 0.93. Identical statistical manipulation of data for egg length as function of hatchling total length, hatchling mass as function of total length, and egg width as function of egg length produce lower linear correlation coefficients of 0.57, 0.38, and - 0.26, respectively. Data recorded from eggs and hatchlings are presented in Table I.

We thank George R. Zug for assistance in preparing this note. Information assembled herein constitutes part of faunal studies of Mason Neck National Wildlife Refuge by the second author.

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—— Robert G. Tuck, Jr., M. Kathleen Klimkiewicz, and Kay C. Ferris, *5431 56th Ave., Riverdale, MD 20840; 5737 13th St., NW, Washington, DC 20011; and 1500 Arlington Blvd., Arlington, VA 22209.*

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AN ENGLISH TRANSLATION OF THE DIAGNOSTIC KEYS APPEARING IN *LES SALAMANDRES D'EUROPE D'ASIE ET D'AFRIQUE DU NORD*

EDITIONS P. LECHEVALIER, PARIS

by

W. Robert Maxwell and Stephen D. Busack

SYNOPSIS OF URODELES OF THE PALEARCTIC REGION IN THE ADULT STAGE

1. Vomero-palatine teeth in transverse series or in the form of a "v", rows converging toward the rear at the front of the parasphenoid........................ 2

1' Vomero-palatine teeth in two longitudinal series, more or less diverging toward the rear and extending posteriorly on both sides of the parasphenoid........... 33

1'' Vomero-palatine teeth in two short series diverging toward the rear, but not extending as far as the parasphenoid..........................*Ranodon wushanensis*

2. No teeth on the parasphenoid (Cryptobranchoidea)........ 3

2' Two groups of teeth on the parasphenoid (Plethodontidae).67

3 Large-sized animals with no movable eyelid (Cryptobranchidae)................................. 4

3' Small-sized animals with movable eyelid (Hynobiidae).... 5

4. Paired tubercles on top of head and chin ....*Megalobatrachus davidianus*

4' Irregularly arranged tubercles on top of the head and chin..........................*Megalobatrachus japonicus*

5. Salamanders having both front and rear toes provided with sharp and compressed claws and a tail shorter than the rest of the body..........................*Hynobius shihi*

5' Salamanders not having the characteristics indicated in sub 5 all together.................................. 6

6. Vomero-palatine teeth in transverse series............. 7

6' Vomero-palatine teeth of which the principal rows form a "v" and diverge anteriorly (*Hynobius*)........... 15

7. Four rear toes (*Batrachuperus*).......................... 8

7' Five rear toes....................................... 13

8. Corneous overlapping on bottoms of feet ....*Batrachuperus pinchonii*

8' No corneous overlapping on bottoms of feet............. 9

9. Upper parts uniformly colored..*Batrachuperus karlschmidti*

9' Upper parts with distinct spots or marbling............ 10

10. Six or less teeth on a series of vomero-palatine teeth.. 11

10' More than six teeth on a series of vomero-palatine teeth...................................... 12

11. No tubercles on palms and soles...*Batrachuperus tibetanus*

11' Two tubercles on the palms and soles ....*Batrachuperus yenyuanensis*

12. Throat with distinct pores........*Batrachuperus cochranae*

12' Throat without distinct pores......*Batrachuperus mustersi*

13. Tail long and nearly round. Claws prominent in some specimens (Onychodactylus).............................. 14

13' Tail strongly compressed................*Ranodon sibiricus*

14. Light-colored band distinct and untouched by body spots...........................*Onychodactylus japonicus*

14' Light-colored band indistinct and overlapped by dark spots.......................*Onychodactylus fischeri*

15. Dorsal parts a uniformly dark slate-brown ....*Hynobius boulengeri*

15' Dorsal parts with spots or markings (sometimes very fine); may simulate a uniform color..................... 16

16. Tail as long as or shorter than the length of the trunk.. 17

16' Tail longer than the trunk............................ 23

17. Round tail, sometimes a little compressed on the posterior portion. Long series of vomero-palatine teeth (length of one branch equal to or much longer than the distance between the interior edges of the choanae).............. 18

17' Compressed tail, short series of vomero-palatine teeth, length of one branch much shorter than the distance between the interior edges of the choanae...... 24

18. Series of vomero-palatine teeth in the form of a "v".....19

18' Series of vomero-palatine teeth in the form of a "u".... 21

19. Fifth rear toe present and well developed.............. 20

19' Fifth rear toe absent or reduced (Species unique to the island of Formosa)................*Hynobius sonani*

20. Upper parts with large yellow spots...*Hynobius stejnegeri*

20' Upper parts without yellow spots.........*Hynobius naevius*

21. Four rear toes, sometimes a reduced 5th................ 22

21' Five well developed rear toes...........*Hynobius okiensis*

22. Very long series of vomero-palatine teeth, the length of one row is longer than the distance separating the exterior edges of the choanae (species unique to Formosa)..............*Hynobius sonani*

22' The length of one row of series of vomero-palatine teeth is shorter than the distance separating the exterior edge of the choanae ....*Hynobius kimurai*

23. Five rear toes...................................... 25

23' Four rear toes.....................*Hynobius keyserlingii*

24. Eleven costal grooves, the head as long as it is wide.............................*Hynobius chinensis*

24' Thirteen costal grooves, the head is longer than it is wide........................*Hynobius leechii*

25. Front feet, when pressed against the body, overlap.. 26

25' Front feet, when pressed against the body, do not overlap or do attain each other at most.......... 30

26. Short series of vomero-palatine teeth, shape of the "v" forming an obtuse angle.......*Hynobius retardatus*

26' Series of vomero-palatine teeth shape of a "u" or "v" forming a right or an acute angle........................ 27

27. Tail about as long or longer than the rest of the body...............................*Hynobius nigrescens*

27' Tail shorter than the rest of the body.................. 28

28. Length of one row of vomero-palatine teeth shorter than the distance separating the two rows at the front............................*Hynobius lichenatus*

28' Length of one row of vomero-palatine teeth equal to or a little longer than the distance separating the two rows at the front.............................. 29

29. Series of vomero-palatine teeth in form of a "u"....................................*Hynobius dunni*

29' Series of vomero-palatine teeth in the form of a "v"............................*Hynobius sadoensis*

30. Dorsal parts with spots or red-brown marbling.............................*Hynobius tauensis*

30' Dorsal parts without spots or red-brown marbling.. 31

31. Eleven costal grooves.....................*Hynobius abei*

31' Twelve to thirteen costal grooves...................... 32

32. Series of vomero-palatine teeth in the form of a "v".........................*Hynobius n. nebulosus*

32' Series of vomero-palatine teeth in the form of a "u"..................*Hynobius nebulosus tokyoensis*

33. Eyes hidden under the skin, two rear toes ....*Proteus anguinus*

33' Eyes well developed, four or five rear toes (Salamandridae)... 34

34. Four rear toes and no gular fold ....*Salamandrina terdigitata*

34' Five rear toes, rarely four and in that case a gular fold is present................................. 35

35. Tail section rounded to oval............................ 36

35' Tail more or less strongly compressed, often with keels or crests................................... 40

36. Dorsal parts with spots or yellow bands on a very dark to black background........................... 37

36' Dorsal parts without yellow spots on a black background.. 38

37. Slender species, tail in the adults much longer than the rest of the body.........Mertensiella caucasica

37' Thick-set species, tail shorter than the rest of the body.........................Salamandra salamandra

38. Species uniformly black..................Salamandra atra

38' Species not uniformly black.......................... 39

39. Tail very long, until twice the length of the body in adults...................Chiloglossa lusitanica

39' Tail about as long as the rest of the body ....Mertensiella luschani

40. A range of dorso-lateral costal protuberances in both sexes.................................... 58

40' No protuberances penetrated by the extremity of the ribs, but sometimes a dorso-lateral pad especially distinct in the male during the reproductive season...................................41

41. The legs, when pressed against the body, do not touch each other (skin smooth although corrugated).........................Pachytriton brevipes (Triturus cristatus dobrogicus, but in this case sometimes the skin is verrucose)

41' The legs, when pressed against the body, do touch each other or overlap............................ 42

42. Males with a dorsal crest in the mating season.......... 52

42' Animals of both sexes having a more or less high, smooth, vertebral ridge.......................... 43

42" No dorsal crest nor vertebral ridge in the female....... 45

43. Ground color of ventral surface a bright red............ 44

43' Ground color of ventral surface yellow or yellow-orange..........................*Cynops ensicauda*

44. The total length of the adult is less than 10 cm...............................*Cynops orientalis*
Presence of a red vermillon spot behind the mouth...............................*Cynops cyanurus*

44' Total length is greater than 10 cm, at least in the adult female, parotoids and dorso-lateral pads are often very distinct..........*Cynops pyrrhogaster*

45. A red vermillon vertebral line, body compressed and high, skin smooth.............*Hypselotriton wolterstorffi*

45' No distinctly red vertebral line, trunk more or less depressed.................................... 46

46. Skin smooth to finely granulated (terrestrial stage), sometimes with scattered tubercles............. 47

46' Skin tubercled... 50

47. Head not depressed, ventral ground color yellow-orange.. 48

47' Head very depressed, ground color of ventral surface grey to yellowish white............................. 49

48. Median zone on ventral surface without spots or with rounded spots.......................*Triturus boscai*

48' Median zone on ventral surface with dark points ....*Triturus italicus*

49. Throat without spots..................*Euproctus montanus*

49' Throat spotted.................*Euproctus platycephalus*

50. Tail without keels or membranes..........*Euproctus asper*

50' Tail with keels or a more or less developed crest.. 51

51. Yellow dorsal spots very well developed ....*Neurergus crocatus*

51' No very distinct yellow spots on dorsum
..................................*Pleurodeles poireti*

52. Dorsal parts with green spots. Venter with
white spots on a dark background......*Triturus marmoratus*

52' No green spots on dorsum. Ground color of
venter yellowish to red-orange......................... 53

53. An immaculate white band bordered with black
along the flanks.......................*Triturus vittatus*

53' No immaculate white band bordered with black
along the flanks...................................... 54

54. Venter with dark spots on the median part.............. 55

54' Venter without dark spots, at least on the median
part.. 56

55. Sides of the head with longitudinal brown stripes,
skin smooth...........................*Triturus vulgaris*
(Rarely *Triturus helveticus* which is distinguished
by the absence of dark spots on the throat)

55' Sides of the head without longitudinal brown
stripes, skin verrucose...............*Triturus cristatus*

56. A longitudinal brown stripe on the side of the
head which passes the eye............*Triturus helveticus*

56' No brown stripe on the side of the head................ 57

57. Three longitudinal furrows on the upper face
of the snout..........................*Triturus montandoni*

57' No furrows on the upper face of the snout
......................................*Triturus alpestris*

58. No vertebral ridge on the back........*Pleurodeles waltli*

58' A very distinct vertebral ridge........................ 59

59. Venter with red-orange spots or venter red-orange
interrupted by a network of black lines (*Paramesotriton*).60

59' Ventral parts (with the exception of the cloacal
region) without the red to red-orange color
(*Tylototriton*).. 62

60. Red-orange venter marked by a polygonal network of black lines....................*Paramesotriton deloustali*

60' Venter black with red spots............................ 61

61. A distinct median bony ridge on the top of the head....................*Paramesotriton hongkongensis*

61' No median bony ridge on the head.*Paramesotriton chinensis*

62. Head triangular when seen from above, snout pointed.....................*Tylototriton andersoni*

62' Head not triangular, snout large and rounded........... 63

63. Round costal nodes, very distinct from each other....... 64

63' Costal nodes square, less distinct from each other...... 65

64. Costal nodes of a lighter color than the back ....*Tylototriton verrucosus*

64' Costal nodes the same color as the back ....*Tylototriton asperrimus*

65. A scarlet red spot on the parotoids, about 16 costal nodes.......................*Tylototriton taliangensis*

65' No scarlet red spot on the parotoids.................. 66

66. About 18 large costal nodes....*Tylototriton kweichowensis*

66' About 12 small costal nodes....*Tylototriton chinhaiensis*

67. Canthus rostralis distinct..........*Hydromantes italicus*

67' Canthus rostralis absent...............*Hydromantes genei*

ADDITIONAL TABLE FOR THE DETERMINATION OF ADULT URODELES FOUND IN EUROPE

(EQUALLY VALUABLE FOR THE NEAR EAST AND NORTH AFRICA)

Arabic numerals refer to the principal synopsis

A. Eyes hidden under the skin, 2 rear toes..*Proteus anguinus*

A' Eyes well developed, more than 3 rear toes............. B

B. Four rear toes.. C

B' Five rear toes.. D

C. Tail, at the most, as long as the rest of the body..............................Hynobius keyserlingii

C' Tail much longer than the rest of the body ....Salamandrina terdigitata

D. Tail section round to oval............................. E

D' Tail compressed, often with keels or crests............ F

E. Webbed toes: see 67 or 67' of main key

E' Free toes: see 36 to 39' of main key

F. A dorso-lateral range of glandular protuberances covering the sides...................Pleurodeles waltli

F' No dorso-lateral range of costal protuberances......... G

G. Male with vertebral crest in reproductive season: see 52 to 57' of main key

G' No dorsal crest on the male, head depressed: see 46 to 51 of main key

SYNOPSIS OF EUROPEAN URODELES AT THE LARVAL STAGE

This table is applicable to larvae with four well-developed members before the changes precceding metamorphosis. Four species are not included: Salamandra atra, Hydromantes genei, and H. italicus in which the newborn young are in an adult stage without gills, and Mertensiella luschani whose larvae are still unknown. Our actual knowledge does not yet permit the establishment of a key for the determination of urodele larva in the entire Paleoarctic region. This key, thus, limits itself to the species found in Europe. Mertensiella caucasica is not properly included in the fauna of Europe but has been found in the U.S.S.R. in the asiatic transcaucaucas.

1. Two rear toes..........................Proteus anguinus

1' Four rear toes.. 2

1" Five rear toes.. 3

2. Caudal extremity rounded........Salamandrina terdigitata

2' Caudal extremity pointed............*Hynobius keyserlingii*

3. Dorsal crest extending the entire length of the back or at least on the posterior half................. 4

3' Dorsal crest extending on less than the posterior half of the dorsum....................................... 12

3'' No dorsal crest, the crest being restricted to the tail... 13

4. Caudal extremity with a filament...................... 5

4' Caudal extremity pointed, obtuse or rounded, but without a filament (Sometimes with a short, spiniform appendage).................................... 7

5. Length of the longest toe or digit does not exceed the distance between the nare and the eye.*Triturus boscai*

5' Length of the longest toe or digit is at least equal to the distance between the nare and the eye..... 6

6. 15 to 16 costal grooves, larva without greenish appearance...........................*Triturus cristatus*

6' 12 to 13 costal grooves, larva with greenish appearance...........................*Triturus marmoratus*

7. Larvae having both rounded or obtuse caudal extremity and the distance between the nares notably greater than the distance from the nare to the eye.....................*Salamandra salamandra*

7' Larvae not having both characteristics indicated in sub 7... 8

8. Extremity of the tail ends gradually in a point forming an acute angle, sometimes the tip is slightly rounded.................................... 9

8' Caudal extremity ends abruptly in a point forming almost a right angle and displaying a small spiniform appendage at the tip..................*Triturus alpestris*

8'' Caudal extremity rounded or in a very obtuse point ....*Triturus montandoni*

9. The longitudinal diameter of the eye is greater than or equal to the distance from the nare to the eye and greater than the distance between the nares.... 10

9' The longitudinal diameter of the eye much less
than the distance from the nare to the eye and
less than the distance between the nares
....*Pleurodeles waltli*

10. Distance from the nare to the edge of the mouth
equal to a third of the distance from the eye
to the nare... 11

10' Distance from the nare to the edge of the mouth
greater than half the distance from the eye to
the nare.....................*Triturus vittatus ophryticus*

11. Longitudinal diameter of the eye about equal,
rarely greater than the distance from the nare
to the eye............................*Triturus vulgaris*

11' Longitudinal diameter of the eye greater than
the distance between the nare and the eye
...................*Triturus helveticus*, *Triturus italicus*

12. Extremity of the tail very obtuse or rounded
....*Euproctus asper*

12' Extremity of the tail pointed.....*Euproctus platycephalus*

13. Longitudinal diameter of the eye shorter
than the distance from the nare to the eye.............. 14

13' Longitudinal diameter of the eye greater than
the distance from the nare to the eye
...................................*Chiloglossa lusitanica*

14. Distance between the nares greater than the distance
from the nare to the eye..........*Mertensiella caucasica*

14' Distance between the nares about equal to the
distance from the nare to the eye......*Euproctus montanus*

Robert Thorn's 1968 publication of *Les Salamandres* consolidates much of our knowledge of the salamanders of this particular portion of the world. Our translation of his keys (pp 315-328) is not intended as a substitute for his work but merely as a supplement to it.

The assistance of Mr. Thorn in the preparation of this translation is greatly appreciated.

Naval Security Group Activity, Fort Meade, Maryland 20755 and
USS Holland (AS-32) FPO, New York, 09501

17 June 1971

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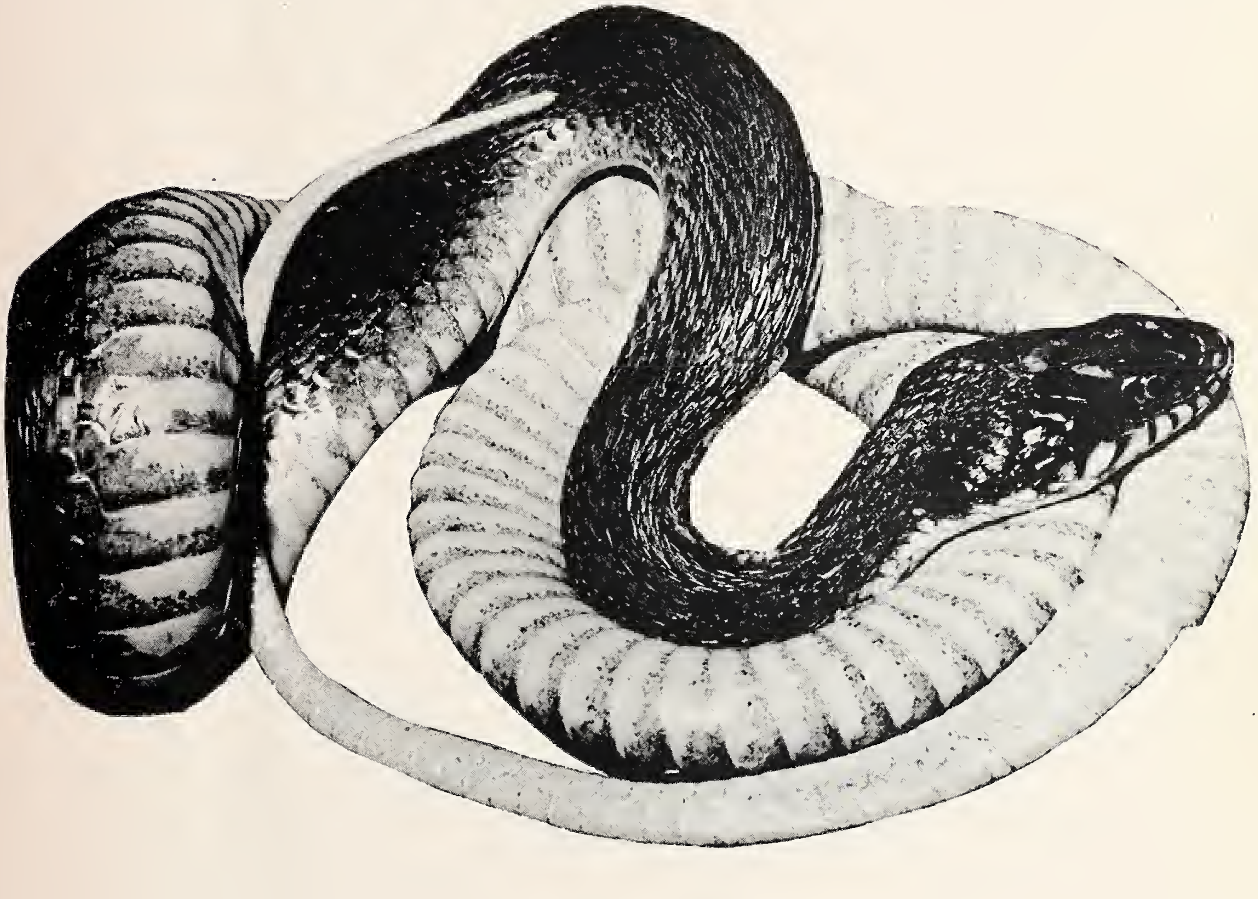

MARCH 1972

VOLUME 8, NUMBER 1

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Errata:
Vol. 7, No. 2, page 36, last paragraph...Based on Webb (1962), should read Based on the literature checked,.

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The Cover: An adult *Natrix e. erythrogaster* from near Blounstown, Calhoun County Florida, Photograph by Dr. R. S. Simmons.

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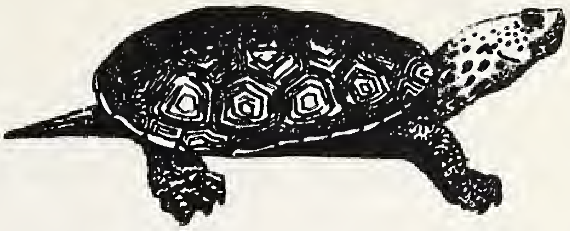

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Additional Records of *Clemmys muhlenbergi* in Delaware, with Notes on Reproduction

The literature records only two specimens of the bog turtle from Delaware (Barton and Price, 1955; Nemuras, 1967). They were taken in Marshallton and Newark, in the northern part of the state. On 8 June 1971, an adult female bog turtle was collected on a highway southeast of Odessa, New Castle County, Delaware, by Mr. John A. Lindsay, who kindly gave it to me for examination. Search of the nearby area during the following weeks resulted in the capture of three additional adults. These specimens add significantly to the number of bog turtles known from Delaware and they represent a range extension southward of about 16 miles.

The specimens were taken at the upper end of a hollow about one-half mile long and from 50 to 100 yards wide. Most of the surrounding land is cultivated, but there are some wood lots. The upper end of the hollow is characterized by an upper area of thick but relatively dry meadow and, at successively lower elevations, an area of brush, a wet meadow of about one-fourth acre, an extensive wooded bog consisting mostly of maples, *Acer* spp., with a dense understory of skunk cabbage, *Symplocarpus foetidus*, and, at its lowest point, a cattail, *Typha latifolia*, marsh. An anastomosing network of small shallow pools covers the hollow, even in summer. The box turtle, *Terrapene carolina*, snapping turtle, *Chelydra serpentina*, mud turtle, *Kinosternon subrubrum*, and green frog, *Rana clamitans*, are common here. This is "typical" bog turtle habitat as described by Barton and Price (1955) and Nemuras (1967, 1969).

The first turtle was taken on the highway at the head of the hollow, an area of meadow. It did not try to escape when discovered. The other three were taken in the wet meadow, all within a distance of 100 feet, and about 800 feet away from the first. One was sunning on a mat of grass and immediately tried to escape by digging into the rank vegetation. Another, the male, was sunning at the edge of a muskrat, *Ondatra zibethica*, runway and quickly attempted to escape by entering the water in the runway. The third was partially hidden on a mat of grass, remaining quiet until picked up.

The date of capture, sex, straight-line carapace length, maximum carapace width and shell height of these specimens are given in Table 1. Coloration and shell pattern of all are typical for the species. The 96.3 mm female seems to be the largest of its sex ever taken. Campbell (1960) mentioned a female of 96 mm, while the largest of 29 females mentioned by Barton and Price (1955) was 94 mm and the largest of 17 for which Nemuras (1967) gave measurements was 95 mm. The rough condition of the shell of my specimen suggested old age; she died 2.5 months after capture.

Table 1. Measurements of adult *Clemmys muhlenbergi* caught near Odessa, Delaware, in 1971.

Date of Capture	Sex	Weight (g)	Straight-line Carapace Length (mm)	Carapace Width (mm)	Shell Height (mm)
8 June	Female	139.7	91.5	68.6	39.5
18 July	Female	143.9	96.3	73.2	37.5
24 Sept.	Male	139.3	98.6	71.5	35.2
28 Sept.	Female	128.6	91.1	64.4	39.6

Barton and Price (1955) stated that actual nesting of the bog turtle has never been observed. Alexanderson (cited by Eglis, 1967) simply stated that this turtle opens and covers a nest in the substrate and Zovickian (1971a) gave additional data on times of egg deposition and depths at which eggs were deposited. The following observations of a nesting female therefore are of interest. The specimen collected on 8 June was observed digging in the rotting wood and sand substrate of the 10 gallon aquarium in which she was kept, between 9:00 and 10:00 P.M. on 24 June. The nest cavity was probably almost completed when digging was first noted. The room was not quite dark when she was discovered, but she continued to dig after lights were turned on. Digging was performed with the hind feet, and is considered to be of two types since the component movements of each type consistently occurred together. One type consisted of a) lowering the leg into the 2.5 inch deep cavity, and then b) several times scratching the side of the hole while extending the leg, resulting in loosening the substrate, followed by c) raising the leg and d) again lowering it into the cavity and e) packing the substrate against the side of the hole with the bottom of the foot. This sequence of movements was repeated 10 or 11 times with a leg before she shifted her body and repeated this procedure with the other leg. The second type of digging movement consisted of a) lowering the leg into the hole and b] raising it while partially rotating it, like a screw turning. This lifted up small amounts of the substrate which were deposited outside the cavity. This sequence was repeated two or three times in succession. She then shifted the body and used the other leg in the same manner. The two types of digging movements, scratching and packing and lifting out substrate, were then repeated.

At 7:30 A.M. the next day the nest cavity was filled. Its surface was well packed and flush with the rest of the substrate in the aquarium, and no sign gave away its location. The nest was then opened, revealing five eggs buried from 1.5 to 3 inches. The sides of the exposed nest cavity were firm, even though the nesting medium was soft and flocculent, indicating the efficacy of the female's packing movements.

The eggs were removed, weighed and measured (Table 2). Each was numbered with india ink and placed in a plastic bag with some of the medium in which they were buried. The bag was sealed and placed in a dimly lighted corner of a living room. In the afternoon of 12 August, the shells of three of the eggs were slit by the hatching turtles. The two unslit eggs were then weighed and measured (Table 2).

Table 2. Weights, lengths and widths of a clutch of *Clemmys muhlenbergi* eggs deposited by a female taken near Odessa, Delaware, in 1971.

	25 June			12 August		
Egg Number	Wt (g) (At deposition)	L (mm)	W (mm)	Wt (g) (Just prior to hatching)	L (mm)	W (mm)
1	5.0	29.7	16.2	6.0	29.4	18.9
2	4.8	30.2	15.3	-	-	-
3	4.9	30.8	15.4	5.5	30.9	17.0
4	4.9	29.4	15.5	-	-	-
5	5.0	30.4	15.5	-	-	-

By 15 August, all young had completely emerged from the shell, with two requiring one day to emerge, the others two days. The time from egg deposition to complete emergence ranged from 50 to 52 days. Each hatchling was given the

same number as the egg from which it hatched, with india ink on the plastron, and later by slightly notching the marginals. All were weighed and measured on 15 August (Table 3). They were then kept in a 10 gallon aquarium with equal areas of water and land. Cuttlebone was placed in the water as a calcium source. The specimens were fed a variety of raw meats fortified with cod liver oil and bone meal and scrapings of cuttlebone. Unfortunately, one hatchling died in October and another in November, although both were active and appeared healthy. A third was killed by the mother which attempted to eat it while both were temporarily in the same container. This female fed more voraciously than the other adults and her hunger seemingly could never be appeased, even though she was slightly obese from the quantities of food consumed. The remaining two young were weighed and measured on 8 December (Table 3). They showed increases in straight-line carapace lengths about equal to those recorded by Zovickian (1971b) for bog turtle hatchlings maintained under similar conditions for about equal periods of time.

Table 3. Weights, straight-line carapace lengths, carapace widths and shell heights of hatchling *Clemmys muhlenbergi* from a clutch of eggs deposited by a female taken near Odessa, Delaware, in 1971. Each hatchling has the number of the egg from which it hatched.

	15 August				8 December			
Hatchling Number	Wt (g)	L (mm) (At hatching)	W (mm)	H (mm)	Wt (g)	L (mm)	W (mm)	H (mm)
1	3.9	24.4	19.5	12.9	4.5	28.3	24.6	11.5
2	3.7	26.2	21.9	11.6	4.8	28.4	25.0	12.0
3	4.2	25.5	22.6	11.5	-	-	-	-
4	3.7	25.3	22.1	11.6	-	-	-	-
5	3.9	25.8	21.9	12.6	-	-	-	-

The three young and the adult female which died are preserved in the authors collection. The remaining adults were released at the capture site in fall, 1971.

I thank Miss Grace Tilger for help in securing references.

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Parasites of Reptiles

by Richard Franz

Part one: Tapeworms

In the next several issues of the *Bulletin of the Maryland Herpetological Society*, I plan to present several articles on reptilian parasites. My purpose is not to offer new material but to enlighten interested readers who desire information concerning the parasites which often infect reptiles. I hope to explain methods of collecting, preparing, and identifying parasite material, and also comment on their morphology, life history, and classification. This first paper discusses tapeworms which commonly inhabit snakes of eastern North America.

Snake tapeworms

Introduction

Tapeworms belong to the phylum Platyhelminthes which also includes planarians and trematodes. Characteristically these worms are flattened dorso-ventrally and, except for the various forms of planaria, most species are parasitic. They exhibit bilateral symmetry and lack a definite anus. Skeletal, circulatory, and respiratory systems are also absent. The spaces between the internal organs and the body wall are filled with a fluid containing both free-flowing and fixed cells of various types.

The phylum Platyhelminthes is divided into three classes, one of which is Cestoda or tapeworms. Tapeworms are divided into two subclasses - Cestodaria (unsegmented tapeworms) and Eucestoda (true tapeworms). The unsegmented worms inhabit the coelom of primitive fishes including sturgeons, chimaerids and sharks. One group has also been recovered from tortoises. The true tapeworms are parasites of the alimentary tract and associated ducts of vertebrates. This subclass is divided into eleven orders of worms but only three (Proteocephala, Cyclophyllidea, Pseudophyllidea) parasitize reptiles. The order Proteocephala contains the most important cestode parasites of reptiles. Tapeworms belonging to this order are distinguished from those of other orders by having a scolex with four sessile suckers, vitellaria in two lateral bands, a bilobed ovary in a posterior position and a uterus with numerous lateral diverticula. The order houses three families - Proteocephalidae, Monticelliidae, and Ophiotaeniidae. The first two contain tapeworms of freshwater fishes and the latter, those of amphibians and reptiles. Within the order, there are 37 different genera but only ten infest reptiles and amphibians (Table I). Of these, four inhabit snakes but only one, *Ophiotaenia*, is common in the snakes of eastern North America. The genus *Ophiotaenia* has a world-wide distribution and can inhabit snakes belonging to any of the major snake families.

Morphology of ophiotaenid tapeworms

The body of true tapeworms is divided into three parts: 1) An anterior scolex usually containing holdfast organs including suckers, hooks, grooves, spines or combinations of these, 2) a smooth undifferentiated neck, 3) a posterior strobila containing a chain of segments or proglottids housing both the male and female reproductive systems (Figures 1, 2). Although all of the above structures are used in identification, the proglottid is the most useful. Proglottids are visually different at different points on the strobila. The first anterior proglottids behind the neck are usually small with little differentiation of internal structures. Beyond the immature segments, the reproductive systems are well developed. Each proglottid accomodates the testes, vas efferens, vas deferens, cirrus pouch and cirrus of the male and the ovary, vitelline glands, oviduct, Mehlis' gland, uterus, and vagina of the female. Sperms are produced by many testes. Each testes is attached to a vas efferens which unite into a common vas deferens which in turn leads into the cirrus pouch. Eggs are produced by a singular ovary; they leave by way of a single oviduct. Fertilization occurs here. Cells from vitellaria join the zygote and pass into the ootype containing Mehlis' glands. The glands secrete a thin membrane around the zygote and vitelline cells. The vitelline cells then complete the egg shell formation from inside. From the ootype, the eggs pass into the uterus and await expulsion from the host's body. During copulation, the cirrus of one proglottid enters the vagina of another of the same worm or into a proglottid of another worm.

In tapeworms of the genus *Ophiotaenia* the scolex is round or quadrangular containing four round suckers and no armature. An apical organ may be present in some species. The neck is long. In the proglottids, the testes lie in two fields lateral to the uterus and anterior to the bilobed ovary. Vitellaria are lateral and extend along the length of the segments (these are best seen in live worms). The wide band-like uterus is median. Specific identifications are based on whether an apical organ is present or absent, the shape of the scolex, the length of the neck, and the number shape, and arrangement of the reproductive organs in the sexually mature proglottids. In order to properly identify species of *Ophiotaenia*, the entire worm, is needed i.e. one containing the scolex, neck, and strobila. Sections or parts can be utilized but this will compound the problems of identification.

Methods for preparing tapeworms

Tapeworms can either be removed intact from recently killed reptiles or egg-filled proglottids can be recovered from the faeces of live ones. In the latter case,

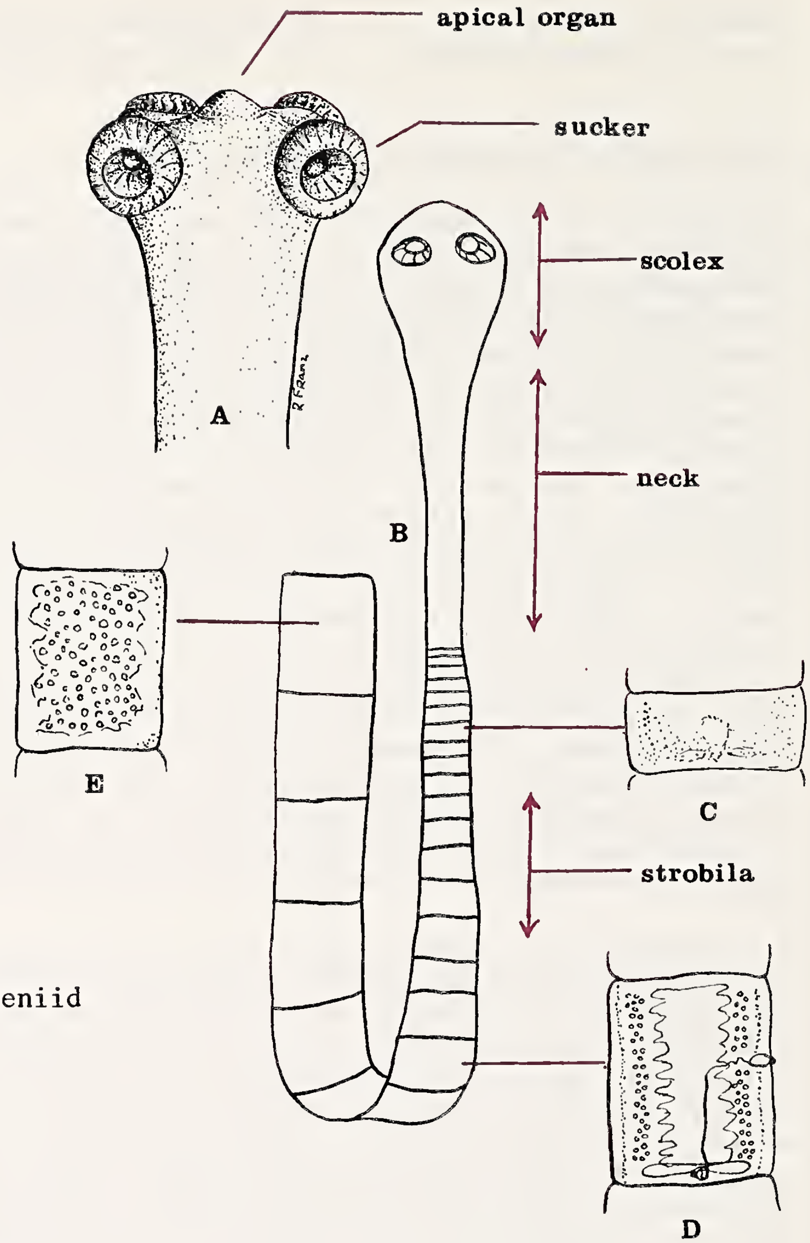

Figure 1. Morphology of ophiotaeniid tapeworms.

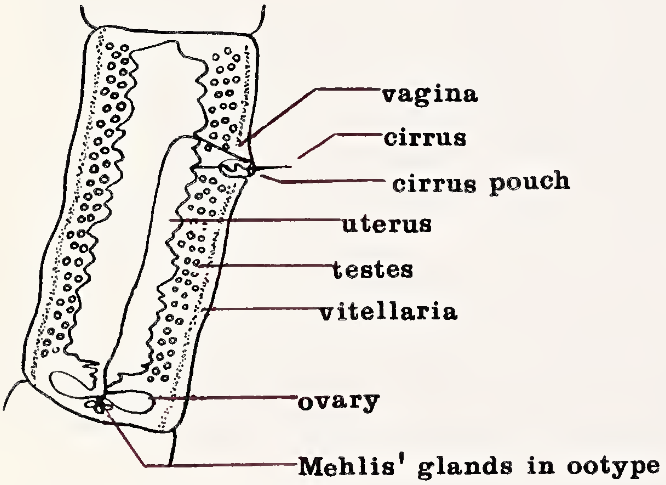

Figure 2. Sexually-mature proglottid showing the position of the more important taxonomic organs.

identification of parasites will be extremely difficult. If you wish to survey the parasites of a certain snake, it will be necessary to kill the host animal. Various methods could be used. An injection of the narcotic, nembutal, is perhaps the most ideal but securing it will be most difficult. Other methods include etherizing, injecting formalin into the brain, or freezing, however, each of these methods has certain drawbacks. Recent D.O.R. specimens are excellent sources of parasites. The postmortum must be made within 3 hours of death unless the host has been refrigerated. Refrigeration will allow the postmortum to be put off for several more hours. One problem with waiting is that soon after the host animal dies the parasites begin migrating. Worms which normally inhabit the intestine may wander into the esophagus, mouth, stomach, or other organs. Frequently, it is a great help in identification to know where the parasite normally resides.

Upon securing a tapeworm, place it in a 0.7 percent saline solution. It will remain alive for several hours in this solution. Various techniques for killing these parasites have been used but the most successful is to freeze them (in saline solution). This method provides completely relaxed specimens.

After freezing (2-3 hours), place the worms in hot FAA to fix the tissue. The next step is to wash the worms with distilled water. At this point, certain decisions must be made concerning the kinds of stains to be used. If you wish to use a water-based stain, it must be applied now. Alcohol-based stain is used after the worms have been placed in 70 percent ethanol. After washing (and staining with water-based stain) begin dehydration of the tissue. Allow the tissue to stand in three ethanol solutions (30, 50, 70 percent) for 30 minutes each. Stain with alcohol-based dye after 30 minutes in 70 percent. Many stains could be used but I recommend Semichon's Carmine (50 ml. glacial acetic acid; 50 ml. distilled water; excess powdered carmine; heat to 100° C for 15 minutes; cool, decant, filter; dilute half and half with 70 percent ethanol). Stain for 25 to 45 minutes depending on the size of the worm, smaller worms requiring less time. Remove the stain and rinse with 70 percent ethanol. Place worms in acid-alcohol (approx. 50 ml. of ethanol, 5 to 8 drops of concentrated HCl) for 5 to 30 minutes, again this depends on the size of the worm. The acid-alcohol will remove excess stain. Allow the tissue to stand in this de-stainer until the tissue becomes paler. Remove the worm and rinse with 70 percent ethanol. Add a few drops of ammonium hydroxide to neutralize the remaining acid. After several minutes, place the worm in 95 percent ethanol for 30 minutes, than into 100 percent for one hour. Next place the worm in a clearing agent. Oil of wintergreen is the best. Remove, then mount the specimen on a glass slide with Permount. Set cover slip and let dry.

Tapeworms of the genus Ophiotaenia

The genus *Ophiotaenia* which was established by La Rue in 1911 to house the cestode, *O. perspicua*, now contains 39 species (Table 2). It differs from other genera in the family Ophiotaeniidae by having lateral vitelline bands extending along the entire lateral margin of the segment, muscular ridge surrounding each sucker, suckers lying directly on the surface of scolex, and mature proglottids longer than wide. Instead of worrying with these features ,I believe that it can be assumed that if you have a tapeworm having the characteristics of the family from a snake from the United States it is in all probability the genus *Ophiotaenia*. Five species are known from snakes of eastern North America. The following is a key to these tapeworms:

1a. Most of strobila immature segments (only 20-40 gravid and mature segments); uterine pore single, large, lying in front of transverse axis of segment; no apical organ; testes 150-200.

O. marenzelleri

known from *Ancistrodon piscivorus*

1b. Most of strobila consisting of gravid and mature proglottids. 2

2a. Apical organ well developed or may be rudimentary. 3

2b. Apical organ absent. 4

3a. Genital pore lying at posterior end of first 1/6 to 1/4 of segment margin; vagina opening behind and ventral to cirrus pouch; testes 390 to 420.

O. faranciae

known from *Farancia abacura*

3b. Genital pore at end of first 1/3 of segment margin; vagina opening anterior to cirrus pouch or its position not determined; testes 150 to 215.

O. perspicua (*O. lactea* synonym)

known from *Natrix sipedon, N. fasciata,*

N. rhombifer, Thamnophis elegans, T. sirtalis

4a. Vagina opening anterior or posterior to cirrus pouch; testes 200 to 250.

O. grandis

known from *Ancistrodon piscivorus*

4b. Vagina opening posterior to cirrus pouch; testes about 90 to 100.

O. ancistrodontis

Known from *Ancistrodon piscivorus*

Testudotaenia- (2 sp.) parasites of turtles- *Amyda, Hydromedusa;* North and South America.

Crepidobothrium- (4 sp.) parasites of snakes- *Boa, Eunectes, Lachesis;* South America.

Tejidotaenia- (1 sp.) parasites of lizards- *Tupinambis;* Dutch Guiana.

Deblocktaenia-(1 sp.) parasites of snakes- *Ichycyphus;* Madagascar.

Macrobothriotaenia- (1 sp.) parasite of snakes- *Xenopeltis, Natrix;* India.

Batrachotaenia- (15 sp.) parasite of amphibians- *Necturus, Ambystoma, Hyla, Rana, Amphiuma, Cryptobranchus, Leptodactylus;* North and South America.

Ophiotaenia- (39 sp.) parasites of snakes (with exceptions of *O. trionychium* which inhabits the turtle, *Amyda;* and *O. striata* the lizard, *Lialis*)- Boidae, Viperidae, Crotalidae, Colubridae, Elapidae; North and South America, Africa, Europe, Asia, Australia.

Kapsulotaenia- (3 sp.) parasites of monitors- Africa, India.

Rostellotaenia- (4 sp.) parasites of monitors- Australia, Komodo.

Acanthotaenia- (5 sp.) parasites of monitors- Malaya, New Guinea, Africa, Australia.

Table 1. The ten genera of tapeworms which belong to the family Ophiotaeniidae.

O. perspicua	North America	*Natrix, Thamnophis*
O. adiposa	Africa	*Bitis*
O. ancistrodontis	North America	*Ancistrodon*
O. calmettei	Martinique	*Lachesis, Bothrops*
O. conogolensis	Africa	*Boaedon, Serpentas*
O. crotaphopeltis	Africa	*Crotaphopeltis*
O. dubinini	Europe	*Coronella*
O. elapsoideae	Africa	*Elapsoidea*
O. elongata	Brazil	small snakes
O. europaea	Europe	*Natrix*
O. faranciae	North America	*Farancia*
O. fima	India	*Natrix*
O. flava	Brazil	*Coluber*
O. gabonica	Africa	*Bitis*
O. gallardi	Australia	*Pseudechis, Notechis, Denisonia*
O. grandis	North America	*Ancistrodon*
O. hyalina	Brazil	*Coluber*
O. indica	India	*Naja*
O. japonensis	Japan	*Natrix*
O. jarara	Brazil	*Bothrops*
O. kuantanensis	Malava	*Naja*
O. macrobothria	Brazil	*Elaps*
O. marenzelleri	North America	*Ancistrodon*
O. mjobergi	Australia	*Demansia*
O. najae	India	*Naja*
O. nankingensis	China, India	*Zaocys, Homalopsis*
O. nattereri	South America	*Coluber*
O. nybelini	Africa	*Coronella*
O. ophiodex	Africa	*Causus, Psammophylox*
O. phillipsi	Ceylon	*Trimeresurus*
O. racemosa	Brazil, Europe	*Coluber, Vipera*
O. rhabdophidis	Ceylon	*Natrix*
O. sanbernardinensis	South America	*Helicops*
O. southwelli	Africa	*Causus*
O. spasskii	Europe	*Vipera*
O. theileri	Africa	*Naja*
O. trimeresuri	India	*Trimeresurus*
O. viperis	South America	*Lachesis*
O. zschokkei	Africa	*Naja*

Table 2. Thirty-nine species of *Ophiotaenia* have been described; 12 species (not listed) are questionable.

Life history and ecological role of ophiotaenid cestodes

As in most parasites, the road to survival is a long and difficult one but, from the size of infections in many of the Florida *Natrix* I have examined it must be effective. Generally after the eggs leave the final host animal, they must enter water. Upon hatching they penetrate the body of a copepod (in many cases, *Cyclops*). These copepods must be ingested by tadpoles. After the tadpole transforms, the young tapeworm (plerocercoid) may break into the frog's coelom. When the infected frog is eaten by a snake, the young cestode develops into the adult worm living in the intestine of the snake.

The odds that a parasite will survive the rigors of its early life are quite remote. In order to compensate for this, each mature tapeworm produces tremendous numbers of eggs. This will assure survival for that species. In a population of green watersnakes from Orange Lake, Florida, there was a 100 percent infection rate (based on a sample of 41 snakes). In this sample, the infection size never exceeded 30 and probably the tapeworms never really posed a problem for the infected snakes. Actually, it would be very inefficient for a parasite to kill its host. In captivity, infection rates seem to be somewhat higher. Whether they would ever prove to be lethal is problematical. In nature, there probably exist some mechanism to prevent over population. Maybe it would take the form of seasonality, hormonal levels in the host, availability of infected food, or some other stabilizing factor. Little or no information is available concerning the relationships between parasites and their hosts in natural situations.

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Editors Note:

The following article, due to its length, will be published in three parts in the next issues of the *Bulletin of the Maryland Herpetological Society*.

Part I
    Chapter I - Introduction and Summary
    Chapter 2 - General or Inclusive Books

Part II
    Chapter 3 - Turtles

Part III
    Chapter 4 - Snakes
    Chapter 5 - Lizards
    Chapter 6 - Crocodilians
    Appendix

The author, Anthony J. Kohler, will attempt to answer any questions or problems concerning captive reptiles, if you write him and include as accurate an identification of the animal as possible and describe the nature of the problem. Enclose a stamped, self-addressed envelope and mail to:

Anthony J. Kohler
1300 30th Street
B-1, No. 18
Boulder, Colorado 80303

The Common Books on Reptile Care: A Comparative Overview-Part I

by Anthony J. Kohler

CHAPTER 1 - INTRODUCTION AND SUMMARY

This paper is intended as a comparison of the books on reptile care which are commonly available. Some books have been omitted, through oversight or unavailability, but most are included.

Some ideas are expressed by the majority of books actually sold in the pet trade, either explicitly or by implication; two in particular stand out. The first is a dependence on the pet dealer for supplies or information. While an occasional dealer can supply the best of either, the dealer who both can and will is a rarity.

The second is recommendations to buy various gadgets from the pet store. Many are useless, some are harmful, and a large number, in this as well as other areas, can be improvised by the animal owner at less cost.

It would be appropriate to mention here that the frustrations resulting from the books' information, and the effects of their mis-information, affect not the author, manufacturer, or the dealer, but the animal.

The books have been discussed and subjectively rated in 10 categories (see appendix).

1. Caging - this is the combination of cages and cage furnishings, exclusive of mechanisms or arrangements for the manipulation of temperature.

2. Feeding and drinking - specific foods, nutritional requirements such as vitamins and minerals, and, where applicable, methods of offering water to drink.

3. Temperature - whether a range of temperatures (or a specific temperature) is stated, how accurate it is, and if the methods are reasonable for the animal.

4. Species-specific requirements - out of the ordinary requirements which are needed for the survival of particular species in captivity.

5. Diversity - ability of the book to live up to any limitations or lack of limitations indicated by the title.

6. Health problems - coverage of diseases and parasites - how many are mentioned, what cures are given, and whether the cures are effective and feasible for the average pet owner.

7. Responsibility - such factors as the amount of information actually contained in the book, whether the book was designed to sell or save animals, and inaccurate statements not covered in other categories.

8. Pictures - how many, too many or too few, whether they were badly chosen (or badly taken), captions.

9. Breeding - for the purposes of the hobbyist, specifically, hatching eggs or treating pregnant females. Also covers any special necessities to promote breeding.

10. Bibliography - covers bibliographies, references, and selected reading lists. No differentiation is made; the purpose of the evaluation is to consider the opportunities the reader is given to acquire more information.

A few errors in various books escaped being pointed out; in other cases, only a selected few were pointed out for lack of space.

In addition to the various text cited throughout this work, the following references were also used:

1. Roger Conant. *A field guide to reptiles and amphibians. Boston. Houghton Mifflin Co.* 1958.

2. H. G. Dowling, S. A. Minton, Jr., F. E. Russell. *Poisonous snakes* of the World. Dept. of the Navy. Washington, D. C. 1965.

3. Robert C. Stebbins. *A field guide to western reptiles and amphibians. Boston. Houghton Mifflin Co.* 1966.

4. J. D. Wallach, D.V.M. "Medical Care of Reptiles". Journal of the American Veterinay Medical Association, Vol. 155 No. 7. pp. 1017-1034.

CHAPTER 2 - GENERAL OR INCLUSIVE BOOKS

1. E. Ross Allen, Wilfred T. Neill. *Keep Them Alive!*.Silver Springs, Fla. Ross Allen's Reptile Institute Special Publication No. 1, Second Edition. Dec. 1954 26 pp.

2. John F. Breen. *Reptiles and Amphibians In Your Home*. Jersey City, N.J. TFH Publications. 1967 281 pp.

3. John F. Breen. *Reptiles - Their Habits and Care*. Fond du Lac, Wisc. All-Pets Magazine. 1949 115 pp.

4. Ian Harman. *Reptiles as Pets*. London. Blanford Press Ltd. 1950 115 pp.

5. Isabel Hoopes. *Reptiles in the Home Zoo*. Boston, Mass. Museum of Science, Boston. 1962 58 pp.

6. Mervin F. Roberts. *Beginning the Terrarium*. Jersey City, N.J. TFH Publications. 1961 32 pp.

7. Mervin F. Roberts. *Your Terrarium*. Jersey City, M.J. TFH Publications. 1963 64 pp.

8. Paul Villiard. *Reptiles As Pets*. Garden City, N.Y. Doubleday. 1969 188 pp.

9. Zdenek Vogel, *Reptiles and Amphibians, Their Care and Behavior*. Trans. by Gwynne Vevers. London. Studio Vista. 1963 228 pp.

Books 2, 6 and 7 are the only books in this category that are commonly found in pet shops. 1 and 5 are special publications of limited distribution; 8 and 9 can be obtained through bookstores, and 4, to the best of my knowledge, is not presently available in this country.

Keep Them Alive! is one of the better books available to the average reptile owner; its restricted distribution is unfortunate. It is comprehensive, easy to understand, and commendably accurate.

The sections on cages and cage furnishings are very good, especially for snakes and turtles. Special emphasis is given to materials and to cage set-ups for species of snakes which require certain distinct environments to survive in captivity, such as those snakes (e.g., *Farancia*) which require bog-type accommodations.

The sections on feeding are also good, with particular emphasis on those reptiles which demand special food or feeding techniques.

Temperature is covered fairly well, although the temperature given for captive reptiles hibernating (60°F) seems too high. More regrettable is the lack of stress on warmth, since it usually seems to be the most neglected requirement.

Most native species of reptiles are covered; however, relatively few foreign species are described in any detail, other than caimans.

The secion on treatment of diseases and parasites is adequate but outdated. For example, there is little mention of antibiotics, although they are quite useful to the contemporary reptile keeper. This may have been revised in a more recent edition.

Recommendations against keeping venomous reptiles (and the care to be taken if one insists) are proper in any book of this type, whether it is intended for the novice or the experienced reptile keeper. There is unfortunately no mention made of the legal difficulties, as many cities prohibit keeping certain reptiles, usually venomous snakes and lizards.

There are only three illustrations (one half-tone photograph and two line drawings), all illustrating parts of the text. The applicability of pictures is more important than the number of them, and the book shows up well here.

The paragraphs on breeding, specifically hatching eggs, outline an effective method but do not admit to other, equally effective methods.

The bibliography, for anyone desiring further reading on the subject, is extensive, covering both technical and popular works.

Reptiles and Amphibians In Your Home is a disappointment. It is not badly written, but it is often inaccurate, overly spectacular, and limited. From the title, some coverage of amphibians as pets would be expected, but their only coverage is a few pictures and their use as food.

The chapter on caging and cage furnishing is better than average. It gives detailed instructions for setting up the basic varieties of vivaria (i.e., desert, woodland, shoreland, etc.) but recommends set-ups more densely planted or more complicated in construction than are favored in this country today.

The chapter on feeding and the occasional mentions of individual species' food requirements is average. Mention is made of possible intestinal blockage by mealworm chiton, but the impression is marred by omission of a warning of the toxicity of the manure worm and by hard and fast statements such as, "In captivity all kinds of rattlesnakes must be fed live mammals", which takes no notice of those snakes which will eat frogs (e.g., *Sistrurus catenatus*) and the large number of snakes which will accept (or prefer) pre-killed food, both mammals and birds.

The mention of temperature in the various sections is accurate but overly short. It is passed off in one sentence and not emphasized as it should be.

The particular requirements of various species are true as given, but they are of little note as the species mentioned are among the easiest to keep in captivity. The more difficult species are ignored or passed over as unkeepable.

The book has little diversity. The title suggests a book which contains a large amount of information enabling the novice to successfully keep a wide variety of both reptiles and amphibians, but in reality only a handful of the most common, easily kept and widely available forms of reptiles are treated.

Diseases and parasites receive very summary treatment. Only about a half-dozen are mentioned, several being deficiency diseases peculiar to turtles (e.g., soft shell). The suggested treatments are inexact, as for example suggesting that antibiotics used for the treatment of pulmonary diseases in humans be used for the treatment of similar diseases in snakes, but giving no dosage, however approximate. Other suggested treatments are relatively ineffective, in comparison with other available treatments, for example the suggestion to treat mites by swabbing the afflicted snake with "some good, but mild, antiseptic, such as Listerine or Mercurochrome."

One cannot help but seriously question the responsibility of a book directed at novice reptile keepers which recommends keeping poisonous snakes and lizards in the home, or shows people holding large constrictors (*Constrictor, Eunectes*) around their necks without any mention of the dangers of such acts. This book does both. Most professional herpetologists seem to agree that venomous reptiles have little, if any, place in the home and none in the possession of an amateur.

The pictures in this book are quite spectacular, numbering 88 color photographs, 190 half-tone photographs, and two line drawings. 121 pages are given over entirely to pictures and captions (counting several that are over half empty), 75 have approximately half or more of the page taken up by pictures and their captions but have some text, and an additional 25 have pictures of less than half-page size with text, for a total of 167 pages of pictures out of 281 pages in the whole book. Not only is the number of pictures overwhelming, but at least 15 are miscaptioned and in most of these cases, the same species is pictured elsewhere in the book, properly captioned. As examples, while two pictures (p. 188, p. 232) are identified as *Kinosternon subrubrum*, the latter is actually *K. scorpioides*; *Caiman sclerops* is variously identified as *C. crocodilus* (p. 143), *C. sclerops* (p. 23), the Pike Alligator (p. 19), *Crocodylus fuscus* (pp. 16, 17) and *Crocodylus acutus* (p. 24). In at least as spectacular an error, *Echis carinatus* is identified as the Sand Rattlesnake (p. 128). With so many misidentifications and a similar number of misspellings of scientific names when there are so few in the text, the authorship of the pictures and captions (as distinct from the text) could well be questioned.

Instructions on breeding reptiles in captivity are limited to one sentence advising hatching lizard eggs in damp sand, 75°F. In the same vein, *Flgaria scincicauda* (presumably *Gerrhonotus multicarinatus scincicauda*) is stated to be ovo-viviparous instead of oviparous.

There is neither a bibliography nor picture credits.

Reptiles - Their Habits and Care is almost identical with the preceding book. The changes in the preceeding consisted of additions rather than corrections, which accounts for the previous, newer book seeming out of date. However, the publication date of this edition is nearly 20 years earlier, there are only 41 half-tone photographs and 9 line drawings, and most of the reptiles that are unsuited to private ownership in homes (e.g., *Echis carinatus, Gavialis gangeticus, Varanus komodoensis, Dendroaspis angusticeps*) are not pictured, making this book more acceptable.

Reptiles As Pets (Harman) is an adequate book. It is old and fairly restricted, but readable and accurate.

The section on caging follows the European trend toward heavy planting, but does give good advice for modifying cages to suit the reptile-keeper's needs.

Feeding is covered along with each animal, and, while accurate, demonstrates, by a failure to mention specific, necessary nutrients (particularly calcium) that the British prefer adult or near-adult animals, rather than the young specimens so popular in this country. The most serious omissions are with regard to turtles and alligators.

Temperature is mentioned in the chapter on general maintenance, and while not subsequently emphasized, is adequately warm, a point favoring this book over other British books that I have seen.

The species covered, with their individual requirements, are those normally available to the average Briton. either wild or in pet stores. The title could have been better chosen, perhaps; in addition to the restricted coverage, the term "reptile" is used to indicate any herptile on a general basis, and the term "amphibian" could have been included to better the situation.

There are three conspicuous omissions, from the American viewpoint, in the chapter dealing with diseases and parasites: mites, mouthrot, and the deficiency diseases so prevalent in juvenile turtles. This again reflects the British preference in animals.

In the area of responsibility, only two points come up, which deal with the same basic subject. First, on p. 62, the author states that poisonous snakes are viviparous, which is a means of distinguishing them from the harmless varieties. This is true in Britain and probably neighboring continental Europe, but the statement is not so qualified, and could make problems with somebody encountering any number of elapids. Second, the author recommends against keeping Common Vipers in captivity because they are "poisonous and vicious". Poisonous they are, and this should be sufficient reason. Vicious, however, is an individual trait which, from other accounts I have read, is not common.

The book contains 57 line drawings (no photographs) which show enclosures (3) or illustrate species under discussion.

Breeding information, as with temperature data is there; it just must be sought. Instructions for incubating eggs are given with the first species discussion, with items such as viviparous or oviparous and approximate gestation period accompanying the subsequent descriptions.

There is no bibliography.

Reptiles In the Home Zoo is another book for the novice. It is both accurate and easy to understand.

The chapter on cages gives instructions on building a good, serviceable cage for dry set-ups. The glass aquarium is neglected, though--it is mentioned as a standby for lizards and preferred for turtles and crocodilians, but passed over for snakes. In other places, the necessity of covering non-wood floors is mentioned, presumably referring to aquariums, but due to their availability, I believe more mention should have been made of them.

Feeding and drinking are well covered, although not in any great detail. Instructions for force-feeding snakes are given, with the emphasized statement not to be too eager. It is unfortunate that the advisability of releasing native specimens refusing to feed was not similarly stressed.

Temperature is covered, but sloppily. Temperatures between 70°F and 85°F are recommended, with the advice that the animal's behavior will mark the proper temperature. Regrettably, the behavior to look for and the meaning (temperature too low or high) is never given. Also deplorable is the use of the term "heat lamp" when referring to an ordinary incandescent lamp to give warmth, as opposed to an infrared source (which if used in the same manner would be quickly fatal).

The only species covered are the more common native species and the more readily available ones, which results in a book which is good for the beginner, but deficient for the more diversified, experienced keeper. The species covered are all easy to keep and require no specialized care.

Diseases and parasites are generally well-treated, although only the more common ones are mentioned. Some specific medications for mouthrot would be more helpful than "mild disinfectant".

The author's statements are more responsible than most. There are some comments early in the book which are erroneous (dealing with, which snakes have teeth where), but these are harmless. The prohibitions against keeping poisonous snakes and releasing non-native animals are as strong as they can be made without achieving the opposite effect. The one dark spot marring an otherwise excellent record is a picture (p.36) of a woman holding a boa constrictor draped around her neck; even with the tamest of snakes, this is foolhardy to handle a large constrictor in this way.

The pictures in the book (10 photographs, 18 drawings, all half-tone), excepting the one discussed above, are clear and relevant, usually explaining some point of the text.

The information on breeding is sketchy but accurate, giving an outline of how to hatch eggs. There is no breeding information on individual species.

The Bibliography is short but well-balanced, including both children's books and "professional" books (e.g., the Comstock guides).

Beginning the Terrarium concentrates on setting up the cage and selecting the animal(s) to live in it, rather than caring for the animals. However, it has been included because of its availability through the pet trade and the likelihood of its being bought as a book on the care of the animals.

The section on cages and cage furnishing is rather good overall; quite a bit of space is devoted to the advantages and use of the standard aquarium. The one problem here is in the discussion of building a terrarium; a damp-resistant wood is specified. One of these named in the text is California Redwood, which will give off, in water, substances toxic to herptiles. No warning to this effect is included.

The only discussion of feeding is to make one aware of the dangers of mixed populations and uncovered terrariums — that one resident may eat anything smaller or the family cat may have a field day. Mention is made, without identifying any particular species, of the drinking habits of lizards and amphibians.

Temperature is covered with each different variety of terrarium, but is selected more for the terrarium than the inhabitants. Also, the idea of wattage needed overpowers the specific temperature stated; the necessity of being certain that the proper temperature is being reached before ceasing to experiment should be more strongly emphasized.

Requirements for specific species are not covered. Animals are matched to the environment, rather than otherwise.

Diseases and parasites are not mentioned.

The failures in responsibility are varied. First, the native habitat for *Anolis c. carolinensis* is given as desert, although they are also given as being suitable for a woodland terrarium. Second, the description of an outdoor turtle pen specifies wire screening (chicken wire is shown in the photographs) but no mention is made of the climbing abilities of many turtles, including two native to the Connecticut home of the book's author (*Sternotherus odoratus*, *Clemmys insculpta*). Last, apparently due to the similarities and confusion between the Leopard frog (*Rana* pipiens) and the Pickerel frog (*R. palustris*), especially in the East where their ranges overlap, the author blames first the Leopard frog and then unspecified members of the pair for the poisonous secretion of the Pickerel frog.

The pictures are appropriate to the text.

Other than a rejection of the commercial possibilities of breeding herptiles, the general subject is ignored.

The bibliography, or in this case, reading list, is poor; small pet books comprise 6 of the 8. The only book that would contain a worthwhile amount of information is Conant's *Field Guide to Reptiles and Amphibians*.

Your Terrarium is another book dealing more with caging than the animals, but it addresses itself to the animals to a greater extent than the previous book.

Caging is covered in depth, but unfortunately the depth allows more room for errors. Snakes, for example, are said to be suitable inhabitants for elaborately set-up terrariums without any mention of how much easier they are to care for in a simple exhibition cage. Also, the recommended cage size is cramped; a 5-gallon aquarium is said to be sufficient for 3 or 4 small turtles, a few toads or frogs, or a small tortoise. This amount of space is not only small, but fails to allow for growth, which is a necessary consideration with young animals.

Feeding is covered better than in some strictly reptile books. The items concentrated on are those favored by the smaller animals, but this is logical, as they are the ones primarily covered. The two primary failings are: first, the recommendation to rely on whole organisms as food, rather than the use of vitamin supplements, which may work, but could cause trouble. This would be made all the more serious by the complacency of the owner, induced by the book's discussion. Second, the book mentions only mice as food for larger snakes, ignoring the fact that many will eat or even prefer large frogs, lizards, birds, or other food.

Temperature discussions in this book have one distinct error. The author states that native aquatic herptiles do not require artificially heated water. The necessity of a light for basking is pointed out, but heated water is always advisable for reptiles, native or otherwise.

The author has covered a large cross-section of smaller herptiles, but has done it on a general basis, rather than mentioning particular species.

Skin infections of various and usually unspecified varieties are the only diseases of herptiles that are mentioned; other common problems, such as soft shell in turtles or mouthrot or mites in lizards and snakes, are completely ignored.

The book is largely responsible in its content, with one noteworthy exception: its stated opinion of the pet dealer. He is supposedly able to keep the animals in a proper environment, cure diseases and parasite infestations and be a general all-around expert. Occasionally this is true. But far more often than not, the dealer knows significantly less about the amphibians and reptiles he sells than the experienced keeper, and worse, he does not care.

The book is well-supplied with pictures (24 color, 34 half-tone) but not to the point that the reader feels he has been cheated of text. The one unfortunate picture is one including a desert iguana (*Dipsosaurus dorsalis,* p.54), as they are very difficult to keep well in captivity, and this book will not help.

Breeding is not covered at all.

The bibliography is fairly short, but most of the books mentioned are ones which will help the reader with some of the problems this book fosters.

Reptiles As Pets (Villiard) was written primarily for children. This is unfortunate, because the book is one of the most consistently good books available.

The discussion on cages and cage accessories is almost all excellent. The cage sizes recommended are larger than most and afford plenty of room for the animal. Habitat cages are recommended where possible; these are often unnecessary and usually difficult to clean properly, but cleanliness is strongly emphasized. This recommendation, then, would bring little or no harm to the reptile. The one problem is in the field of turtles. Turtle bowls are recommended for young turtles—an accommodation which is difficult to heat properly and prevents the exercise that young turtles need. Large plastic pools are recommended for outdoor use, though; these are preferable.

Feeding is well covered. Dealers' remarks recommending ant "eggs" for juvenile turtles should be ignored, as the book states. No mention is made of possible intestinal blockage by mealworm chiton, which could be detrimental, and baby reptiles are said to need food almost as soon as they are hatched or born, which could cause needless worry as long as the yolk provides adequate nourishment. This last point, though, is not harmful.

Temperature is handled haphazardly; this is the book's major shortcoming. A caiman needs warmth, and this is emphasized. No mention is made of the temperatures for captive snakes. Among turtles, sliders (*Pseudemys sp.*) are said to need a temperature between 75°F and 85°F, which is good, but a warmer (unspecified) temperature is recommended for Map turtles (*Graptemys sp.*), which is dangerous. A range of 60°F - 70°F is given for *Malayemys subtrijuga*; the species is tropical and cold-senitive. Lastly, 70°F is given as a base (standard) temperature for skinks, while 75°F would have been better.

A wide variety of commonly available reptiles, both native and exotic, is covered very thoroughly, other than temperature (see above). Enough other factors are given to make sufficient, if not superior captive environments, and enough is given to give the novice a working informational base for use with other reptiles.

The basic coverage of diseases and parasites is good and, under average conditions, complete. The remedies offered are not always the most effective, but a margin of effectiveness has apparently been sacrificed in favor of greatly increased availability for young readers. Mouthrot is erroneously said to be confined to large constrictors, but this and the lack of descriptions of various vitamin deficiencies (other than eye trouble) are the only problems here.

The book is basically accurate and reliable. Nothing not previously mentioned is stated that will cause trouble; a few non-mentioned points might. The author mentions allowing common iguanas to run loose in the house, but no mention is made of the fact that the lizard will, if unconfined, choose a spot himself to defecate and the site may be highly disagreeable to other residents. Also, no warning about rattlesnakes is given in the part about digging lizards out of holes. Other inaccuracies are of no particular significance, as when the vent and cloaca are said to be the same, or when only partly true, may be of some positive value, as the statement that all reptiles of different sizes will fight. Following this advice might require more cages, but such instances as would occur will be avoided.

The illustrations (68 half-tones) are all pertinent; the only failure here is four misidentifications. *Thamnophis sirtalis infernalis* is given the right common name, but is identified as *T.s. parietalis*. The same happened with the common water snake, *Natrix taxispilota (N. sipedon)*. *Sternotherus* is spelled *Sternothaerus* (superceded name for *Pelusios)*, and the picture of *Terrapene carolina triunguis*, if it is such, is a bad example as it looks more like a *T.c. carolina*, down to the fourth toe on the hind foot. But these are minor.

The paragraph on breeding is thorough, covering both oviparous and viviparous reptiles as general classes, and devotes a significant amount of space to the care of young animals. A warning of possible (even probable) failure might be helpful, though.

There is no bibliography.

Reptiles and Amphibians, Their Care and Behavior is an interesting Book. It is written by a Czechoslovakian herpetologist who keeps herptiles himself.

The discussion of cages is distinctly European-oriented, but well-covered. The sizes of cages recommended are some of the best—both large and small, depending on the animal. A suggestion which should be seen more often is that fine sand should not be used except with those snakes and lizards which are adapted to it in their natural environments.

Eating and drinking are well covered, with care taken to point out that many lizards drink drops from leaves or rocks rather than from a dish. The one missing point is possible intestinal problems from mealworm chiton—the warning given is more to keep the animals from accepting only one food.

Temperature is covered sporadically. A basic range of 77°F - 86°F is given as a base, modified in the text where appropriate. Radiant heat is the recommended form. The unfortunate point is that radiant heat is recommended as a substitute for heated water in the case of crocodilians and turtles. While this is acceptable, heating the water is a good addition to radiant heat and should not have been ignored.

The author gives any special requirements needed for all the herptiles which have passed under his care. This gives a wider range of species, particularly non-native forms, than any other book of the group, but seriously (from an American's viewpoint) neglects the North American species.

Most of the ailments encountered by the average herptile keeper are covered, mainly in one chapter on the treatment of sick animals, but the treatments suggested are usually old and not as effective as some of the more modern ones.

The author includes a thorough warning of amphibian poisons, but the overall responsibility shown in the book fails at two points. First, the keeping of poisonous snakes is considered acceptable — pit vipers and elapids are discouraged, but on the grounds of the care and cage size necessary. The other point is a downgrading of the animals—that reptiles, other than crocodilians, cannot recognize their keeper. This is untrue. It also denotes a superior feeling which does not belong in a scientific work.

The pictures (36 color photographs, 217 half-tone) are well done and well-arranged (16 pp. of text, 8-16 pp. of photos). All illustrate species mentioned in the text, and the feeling of being overwhelmed by pictures is not present. The one shortcoming here is that the color pictures all appear to be originally half-tone photographs, and, as the colors tend to be too pure, would have been more effective in half-tone.

Hatching eggs is mentioned only in passing; a large amount of space is devoted to feeding young specimens, however.

The bibliography is short, but the books are of good quality and informative.

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A Checklist of the Rattlesnakes (*Crotalus durissus* group) of South America

by

Herbert S. Harris, Jr. and Robert S. Simmons

Klauber (1956) stated that at least three subspecies of *Crotalus durissus* (*C. d. cascavella, C. d. cumanensis* and *C. d. terrificus*) would probably eventually be recognized from South America. Conçalves (1950) isolated a toxic protein which he called crotamine from the venom of the South American Rattlesnake. He later (1956) named *Crotalus terrificus crotaminicus* as a biological subspecies, based on the presence of crotamine in the venom. *C. t. crotaminicus* was later incorrectly placed in the synonymy of *C. d. terrificus* by Peters and Orejas-Miranda (1970). It is clear that the snakes containing crotamine in their venom (Schenberg, 1959 and Hoge, 1965) should belong to the subspecies *C. d. collilineatus*. In 1959 Schenberg also demonstrated this difference between the venoms of rattlesnakes in the area of State São Paulo, Brazil. He found that the rattlesnakes in the eastern half of this range had yellow venom (no-crotamin) whereas the snakes in the western half had white venom (with crotamin).

Hoge (1965) in his "Preliminary Account on Neotropical Crotalinae /Serpentes Viperidae/ listed nine rattlesnakes from South America belonging to the *Crotalus durissus* group (MAP 1.). He resurrected four from the synonymy of *Crotalus d. terrificus* (two that Klauber had predicted) and described two others, *C. d. marajoensis* and *C. d. ruruima*. Hoge (1965) used Schenberg's (1959) venom data as one character, to separate two of the subspecies occurring in southern Brazil.

Hoge (1965), apparently assigned specific status to *Crotalus vegrandis*, to which we are in complete agreement. Laneini (1966), in his paper on the redescription and distribution of *Crotalus vegrandis* presented data supporting its specific status. Roze (1966) apparently followed Klauber (1956).

Brongersma (1940) assigned *unicolor* as subspecific of *C. durissus*, a point which is not very well justified in our opinion. *C. unicolor* reached specific status through insular isolation. The differences have been set forth by Gloyd (1936) and Kauffeld and Gloyd (1939) and others. Klauber (1956) recognized its specific status, but apparently Hoge (1965) followed Brongersma (1940). Peters and Orejas-Miranda (1970) followed Hoge (1965) in recognizing *unicolor* as a subspecies of *C. durissus*.

For keys to the species and subspecies of *Crotalus durissus*, see Peters and Orejas-Miranda (1970).

Four subspecies of the *Crotalus durissus* complex are extralimital, *culminatus*, *durissus*, *totonacus* and *tzabcan*.

The *Crotalus durissus* group

CROTALUS DURISSUS CASCAVELLA Wagler

1824. *Crotalus cascavella* Wagler, in Spix, Sp. Nov. Serp. Bras.: 60, pl. 24. Type Locality: Bahia, Brazil; restricted through neotype designation to Mina Caraiba, Bahia, Brazil, by Hoge, Mem. Inst. Butantan, 32, 1965: 139.

1926. *Crotalus terrificus* var. *collirhombeatus* Amaral, Rev. Mus. Paulista, 15: 90, pl. 1. Type locality: Northeastern Brazil.

1966. *Crotalus durissus cascavella*; Hoge, Mem. Inst. Butantan, 32, 1965, pl. 12, p. 139.

Range: The dry caatinga regions of northeastern Brazil.

CROTALUS DURISSUS COLLILINEATUS Amaral

1926. *Crotalus terrificus* var. *collilineatus* Amaral, Rev. Mus. Paulista, 15: 90. Type Locality: none specified in original description; restricted through neotype designation to Estado de Mato Grosso, Brazil by Amaral and Hoge, in Hoge, Mem. Inst. Butantan, 32, 1965: 139.

1956. *Crotalus terrificus crotaminicus* Moura Conçalves, An. Acad. Bras. Cienc, 28: 365. Type locality: Uncertain.

1966. *Crotalus durissus collilineatus*; Hoge, Mem. Inst. Butantan, 32, 1965, pl. 13, p. 139.

Range: Northwestern Parana, western São Paulo, Minas Gerais, Districto Federal, Goiás and Southwestern Mato Grosso, Brazil, and extreme northeastern Paraguay.

CROTALUS DURISSUS CUMANENSIS Humboldt

1833. *Crotalus cumanensis* Humboldt, in Humboldt and Bonpland, Recueil d' Obs. Zool. Anat. Comp., 2: 6. Type locality: Cumaná, Venezuela.

1833. *Crotalus loeflingi* Humboldt, in Humboldt and Bonpland, Recueil d' Obs. Zool. Anat. Comp., 2: 6. Type locality: Cumaná, Venezuela.

1966. *Crotalus durissus cumanensis*; Hoge, Mem. Inst. Butantan, 32, 1965: 142.

Range: Venezuela, except the high mountains of Andes, savannas of State Monagas and Anzoategui where *C. vergrandis* occurs, and the isolated savannas of State Amazonas and State Bolivar. Colombia, central and northeastern Atlantic coast.

CROTALUS DURISSUS DRYINUS Linnaeus

1758. *Crotalus dryinas* Linnaeus, Systema Naturae, Ed. 10: 214. Type locality: America; restricted to Paramaribo, Surinam, by Hoge, Mem. Inst. Butantan, 32, 1965: 143.

1966. *Crotalus durissus dryinus*; Hoge, Mem. Inst. Butantan, 32, 1965: 142, pl. 14.

Range: Coastal Guianas.

CROTALUS DURISSUS MARAJOENSIS Hoge

1966. *Crotalus durissus marajoensis* Hoge, Mem. Inst. Butantan, 32, 1965: 143, pl. 15. Type locality: Tuiuiu, Ilha de Marajó, Estado do Pará, Brazil.

Range: Marajó Island Brazil.

CROTALUS DURISSUS RURUIMA Hoge

1966. *Crotalus durissus ruruima* Hoge, Mem. Inst. Butantan, 32, 1965: 145, pl. 16. Type locality: Paulo Camp, Mt. Roraima, Venezuela, 4000 ft.

Range: Vicinity Mt. Roraima, Venezuela, but probably extending all over the isolated savannas of southeastern Venezuela (Hoge, 1965).*

CROTALUS DURISSUS TERRIFICUS (Laurenti)

1768. *Caudisona terrifica* Laurenti, Systema Reptilium: 93. Type locality: "Habitat in America infra graduum elev. 45"; restricted through neotype designation to Julio de Castilho, Município Taquari, Estado Rio Grande do Sul, Brazil, by Hoge, Mem. Inst. Butantan, 32, 1965: 147.

1956. *Crotalus durissus terrificus*; Klauber, Rattlesnakes, 1: 32.

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*Hoge, 1971 in Venomous Animals and their Venoms, Volume 11, Venomous Vertebrates lists an additional specimen of *ruruima* from Territorio Federal of Roraima, Brazil. Hoge (1965, 1971) also lists specimens from southern State Bolivar and State Amazonas, Venezuela, but states (1965) that these specimens are slightly different.

Range: Rio Grande do Sul, Santa Catarina, Paraná, eastern São Paulo, eastern Minas Gerais and western Rio de Janeiro, Brazil; Paraguay, Uruguay, northern Argentina and Bolivia and extreme eastern Peru (via Bolivia).

CROTALUS UNICOLOR Van Lidth de Jeude

1887. *Crotalus horridus* var. *unicolor* van Lidth de Juede, Notes Leyden Mus., 2 (8): 133. Type locality: Aruba Island, Netherlands Antilles.

1905. *Crotalus pulvis* Ditmars, Ann. Rept. N.Y. Zool. Soc., 9, 1904: 199, pl. Type locality: Managua, Nicaragua; "actual locality doubtful", according to Klauber, Rattlesnakes, 1: 44, 1956.

1940. *Crotalus durissus unicolor*; Brongersma, in Hummelinck, Studies on the fauna of Curaçāo, Aruba, Bonaire and Venezuelan Islands, 2: 131, pl. 12.

1956. *Crotalus unicolor*; Klauber, Rattlesnakes, University California Press, 1: 44.

Range: Aruba Island, Netherlands Antilles.

This is a stunted form which exists in two color varieties, a blue-gray phase and a brown phase. Dorsal diamonds may be present or the specimen may be "unicolor". The color patterns are apparently not sexually dimorphic.

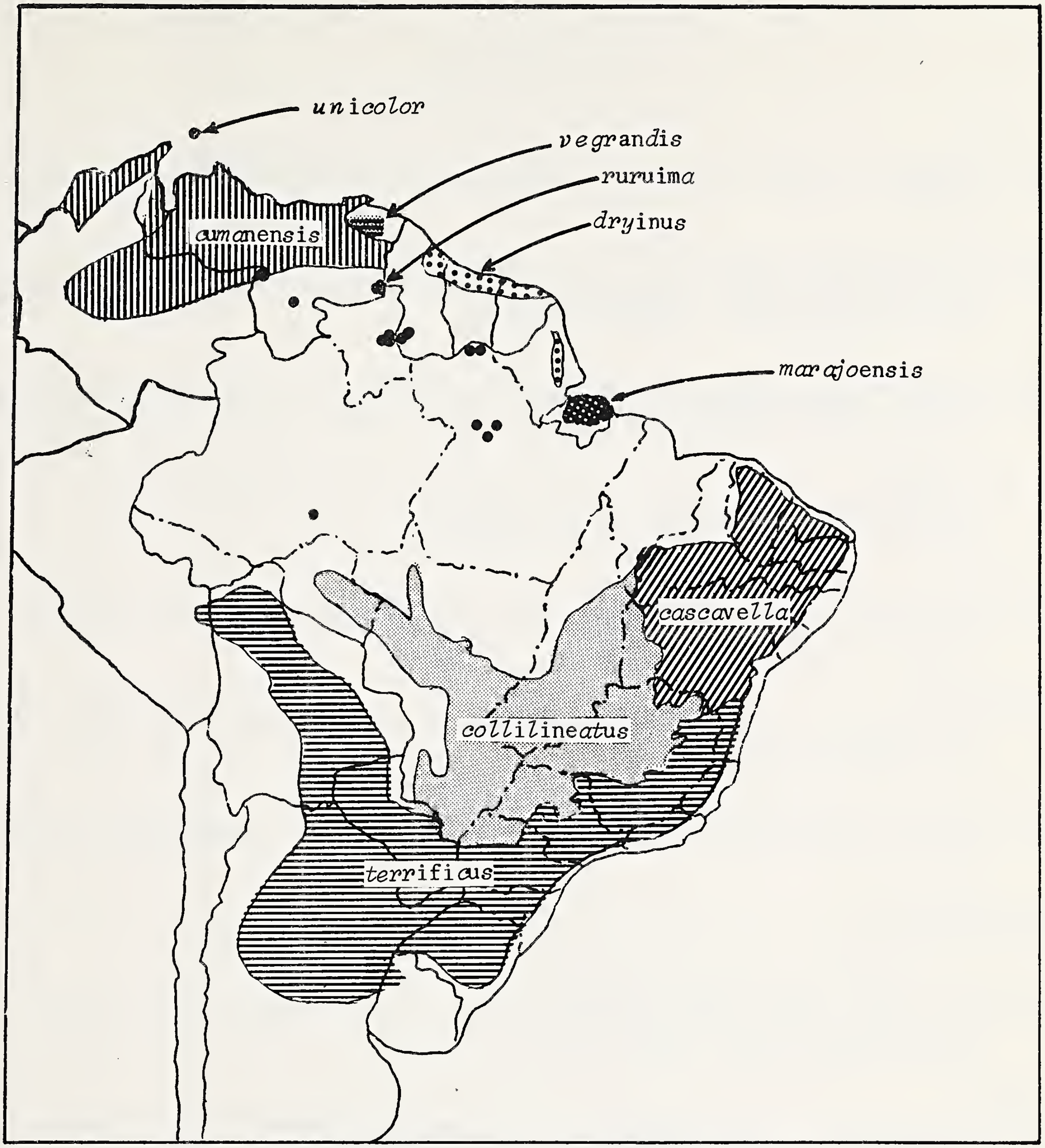
CROTALUS VEGRANDIS Klauber

1941. *Crotalus vegrandis* Klauber, Trans. San Diego Soc. Nat. Hist., 9(30): 344. Type locality: Maturin Savannah, nr. Uracoa, Sotillo District, Monagas, Venezuela.

1956. *Crotalus durissus vegrandis*; Klauber, Rattlesnakes, 1: 34.

Range: More southern savannas of State Monagas and Anzoategui, Venezuela.

This is a stunted form, living mostly in armadillo burrows in the grassy savannas of State Monagas and Anzoategui, Venezuela.. The major food item of this species appears to be *Cnemidophorus*. Laneini (1966) reported *Cnemidophorus lemniscatus lemniscatus*, *Tropidurus torquatus hispidus* and *Hemidactylus mabouia* as abundant in the habitat of *C. vegrandis*. In captivity these snakes feed readily on mice.



MAP 1. Distribution of the *Crotalus durissus* group in South America, *C. d. cascavella*, *C. d. collilineatus*, *C. d. cumanensis*, *C. d. dryinus*, *C. d.* marajoensis, *C. d. ruruima*, *C. d. terrificus*, *C.* unicolor and *C.* vegrandis. Isolated dots represent records of *C. durissus* sp. in isolated savannas. The snakes *cascavella*, *collilineatus* and *terrificus* do intergrade along the edges of their respective common borders, and their ranges may not be as clear as we have indicated here. Adapted from Hoge (1965) and Klauber (1956).

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REPTILES & AMPHIBIANS
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JUL 0 5 1972

BULLETIN OF THE

Maryland Herpetological Society

The Natural History Society of Maryland, Inc.

JUNE 1972

VOLUME 8, NUMBER 2

Bulletin of the Maryland Herpetological Society
Volume 8 Number 2 June 1972

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The Cover: An adult *Crotalus h. horridus* from Frederick County, Maryland. Photograph by Dr. Robert S. Simmons.

Ed. Note: Manscripts being submitted for publication should be typewritten (double spaced) on good quality 8-1/2 by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by author. Reprints are available at $.01 a page ($.02 a page with photographs) and should be ordered when manuscripts are sent in. Minimum order 100 reprints.

The Maryland Herpetological Society, Department of Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

BULLETIN OF THE

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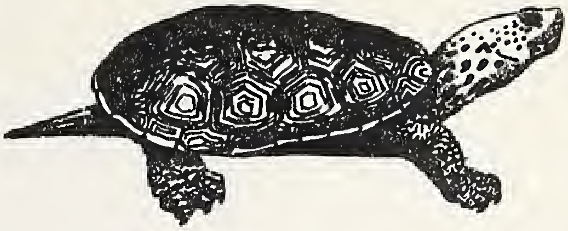

Volume 8 Number 2 June 1972

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Department of Herpetology, Natural History Society of Maryland, Inc.

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Keys to the Neotropical Species and Subspecies of the *Crotalus durissus* Group

by

Herbert S. Harris, Jr. and Robert S. Simmons

Peters and Orejas-Miranda (1970) published the first available keys for the neotropical species and subspecies of the *Crotalus durissus* group which were recognized by Hoge in 1965. Since that time, Harris and Simmons (1972) have reassigned *Crotalus unicolor* to specific status. A few of the characters utilized by Peters and Orejas-Miranda (1970) in their keys, have proven difficult in practice. We therefore offer the following keys at this time with the understanding of their tentative status. They have been adapted from the keys published by Peters and Orejas-Miranda (1970) with changes only where deemed necessary. The figures have been modified from Hoge (1965) in instances where live or preserved material was not readily available. We wish to thank Dr. James A. Peters for his assistance in the preparation of this note.

Key to the Neotropical Species of the *Crotalus durissus* Group

1. Pattern faded or obsolete, never conspicuous---2
   Pattern well-defined, always conspicuous, except posteriorly------------------*durissus*

2. Brown or rust colored dorsally, with scattered white spots or streaks on some but not all scales-----------------*vegrandis*
   Bluish or gray to light brown, pattern of faded or obsolete dorsal rhomboid blotches; never with numerous scattered white streaks on scales---------------------------*unicolor*

Key to the neotropical subspecies of *Crotalus durissus*

1. Centers of rhomboid blotches light, similar to ground color, conspicuous in contrast to rest of blotch; dorsal head patterns distinct (except possibly in some *collilineatus*) (Fig. 1.)-----------------------------------2
   Centers of rhomboid blotches 'not light", similar to ground color, only slightly lighter than rest of blotch; dorsal head pattern indistinct (Figs. 2, 11.)----------*terrificus*

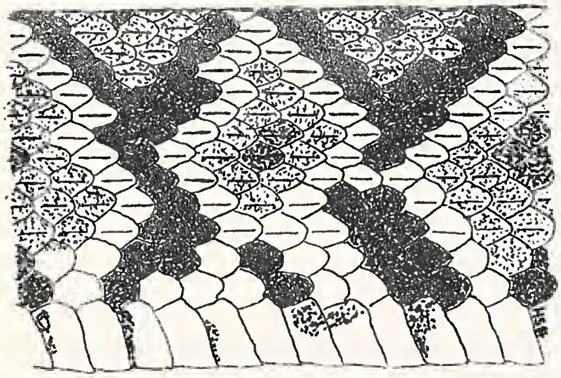

Fig. 1. *Crotalus durissus* subspecies other than *C. d. terrificus.* Vivid contrast.

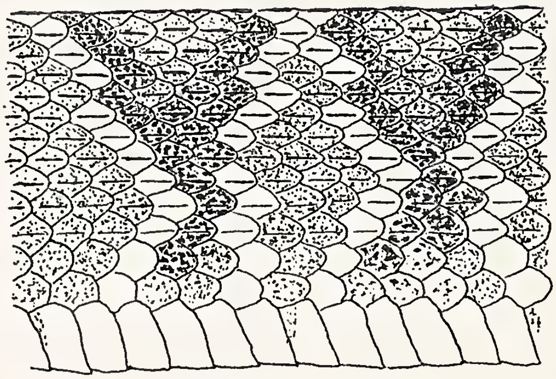

Fig. 2. *Crotalus d. terrificus.* Lack of sharp contrast.

2. Paravertebral nuchal stripes of uniform color, center not lighter or only slightly lighter than borders, less than four scale rows wide-------------------3
   Paravertebral nuchal stripes very broad, usually four scale rows, with white borders and center of stripe lighter than borders (Fig. 6.)-----------------------------*ruruima*

3. Paravertebral nuchal stripes long, usually longer than one head length-----------------4
   Paravertebral nuchal stripes short, less than one head length (Fig. 9.)----------*cascavella*

4. Paravertebral nuchal stripes lack accessory stripes below; may have simple accessory spots---------------------------------------5
   Paravertebral nuchal stripes with continuous or interrupted stripes beneath them, or scattered black scales---------------------6

5. With single, simple accessory spots beneath paravertebral nuchal stripe; ventrals less than, 179 in males and 185 in females (Fig. 3.)-------------------------*durissus*
Lacking any accessory spots beneath paravertebral nuchal stripe; ventrals usually more than, 180 in males, and 186 in females (Fig. 4.)------------------*tzabcan*

6. Paravertebral nuchal stripes with continuous dark stripe below--------------------7
Paravertebral nuchal stripes with series of dark spots below (Fig. 8.)-----*marajoensis*

7. Long distinct paraventral stripe, never distinct supplementary paraventral spot--------------------------------------8
Shorter distinct paraventral stripe or stripes, with or without supplementary paraventral spot-------------------------9

8. An almost continuous paraventral stripe one scale row wide (Fig. 7.)-----------*dryinus*
Paraventral stripe long or consisting of many shorter broken stripes usually involving more than one scale row or stripes on varying scale rows (Fig. 5.)--*cumanensis*

9. Loreal indistinguishable from other lateral head scales; distinct paraventral stripe and supplementary paraventral spot (Fig. 10.)-------------------*collilineatus*
Loreal clearly distinguishable from other lateral head scales; no supplementary paraventral spot (Fig. 5.)------*cumanensis*

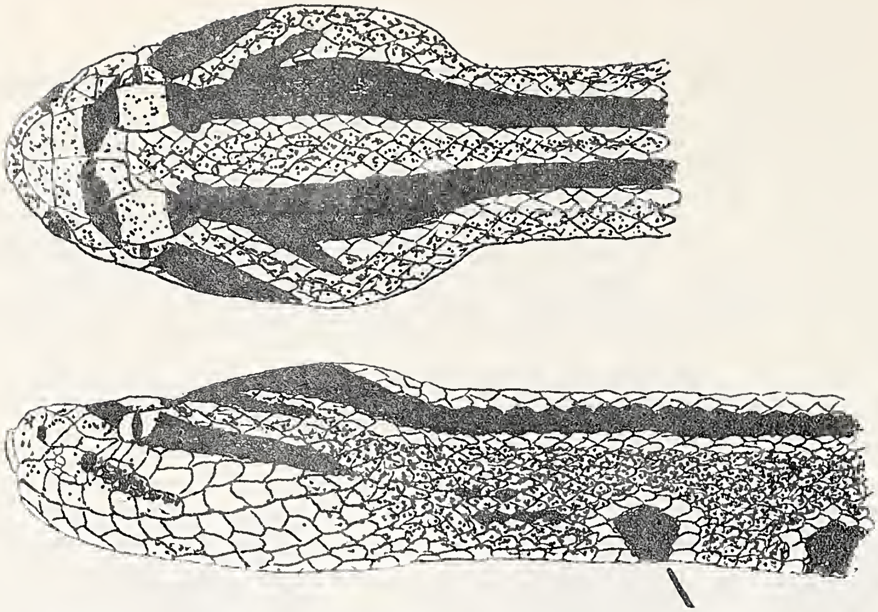

Fig. 3. *Crotalus d. durissus* - showing simple accessory spots.
Range: Central Veracruz, southeastern Oaxaca, Tabasco and Chiapas, Mexico; central and southern Guatemala; southern and western Honduras; El Salvador; southwestern Nicaragua; northwestern and central Costa Rica.

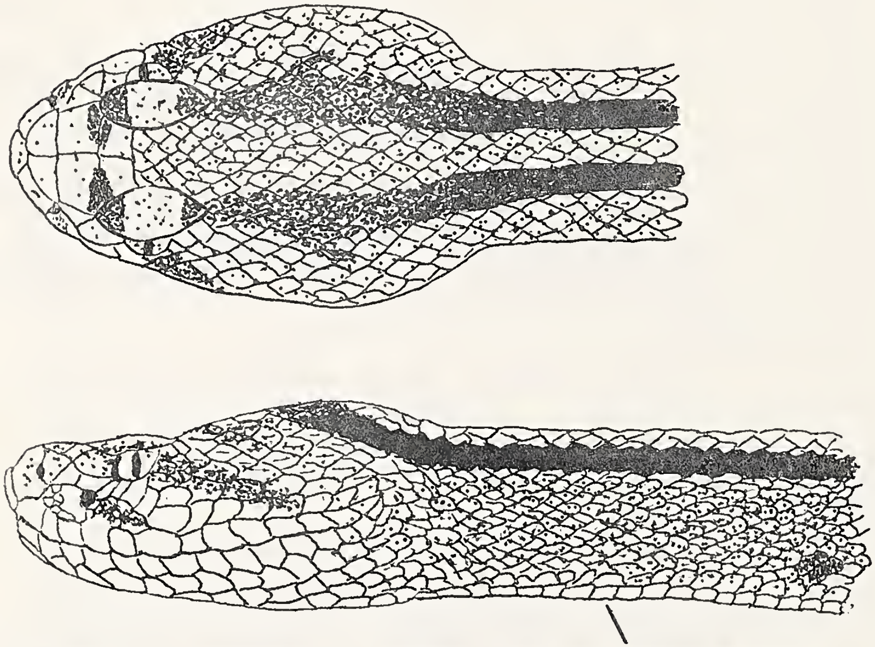

Fig. 4. *Crotalus d. tzabcan* - lack of simple accessory spots, reduced head pattern.
Range: Yucatan, Mexico south to northern El Petén, Guatemala and British Honduras.

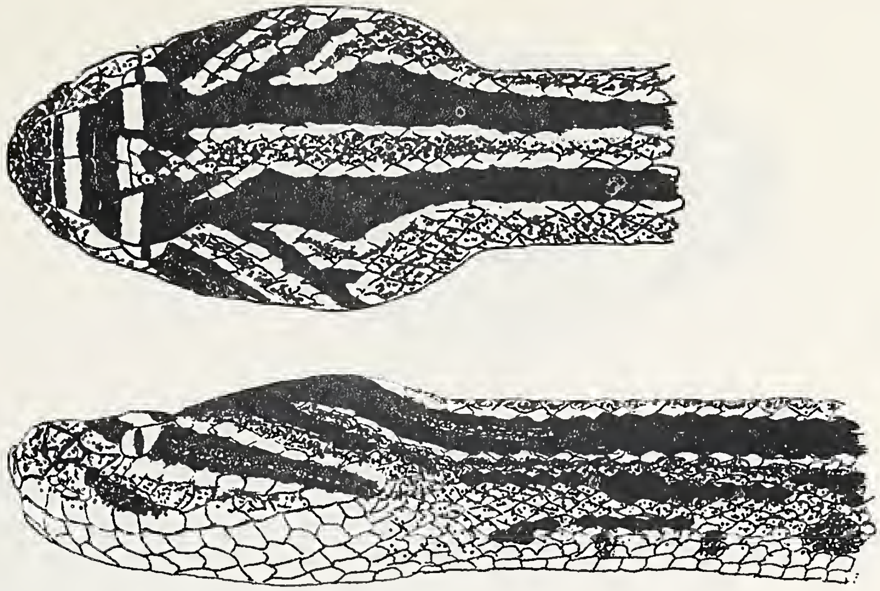

Fig. 5. *Crotalus d. cumanensis* - paraventral stripes usually involving various scale rows.
Range: Venezuela, except the high mountains of the Andes, savannas of State Monagas and Anzoategui where *C. vegrandis* occurs, and the isolated savannas of State Amazonas and State Bolivar; Colombia, central and northeastern Atlantic coast.

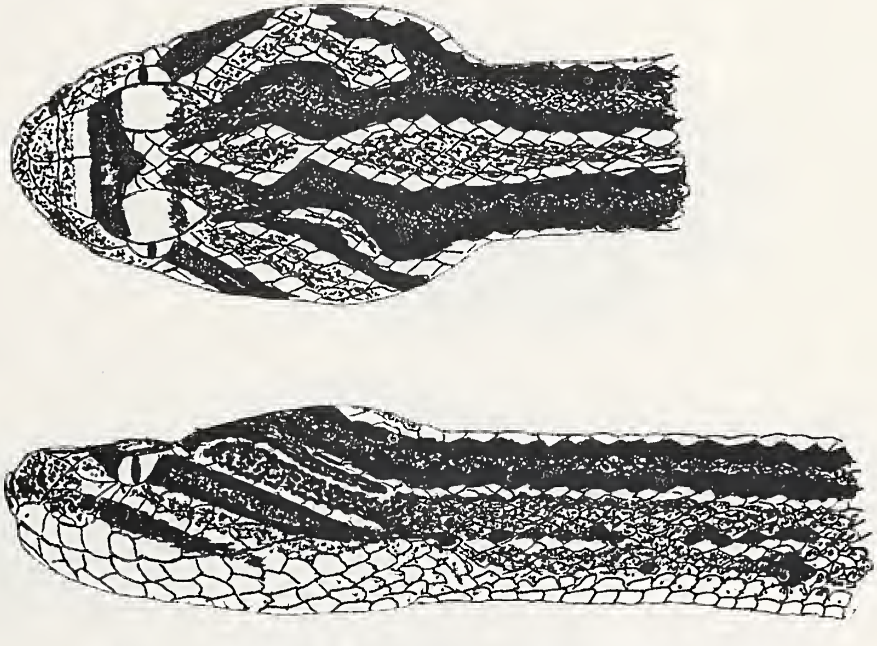

Fig. 6. *Crotalus d. ruruima* - paravertebral stripe four scale rows wide, with lighter center and white borders.
Range: Vicinity Mt. Roraima, Venezuela, but probably extending all over the isolated savannas of southeastern Venezuela (Hoge, 1965). Hoge (1971) mentions specimens from Territorio Federal, Roraima, Brazil.

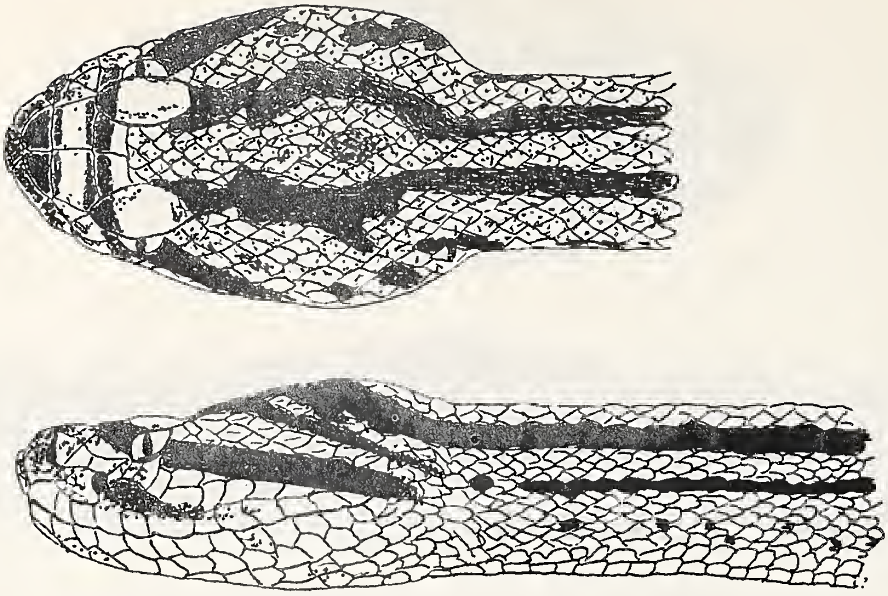

Fig. 7. *Crotalus d. dryinus* - a one scale wide black paraventral stripe.
Range: Coastal Guianas.

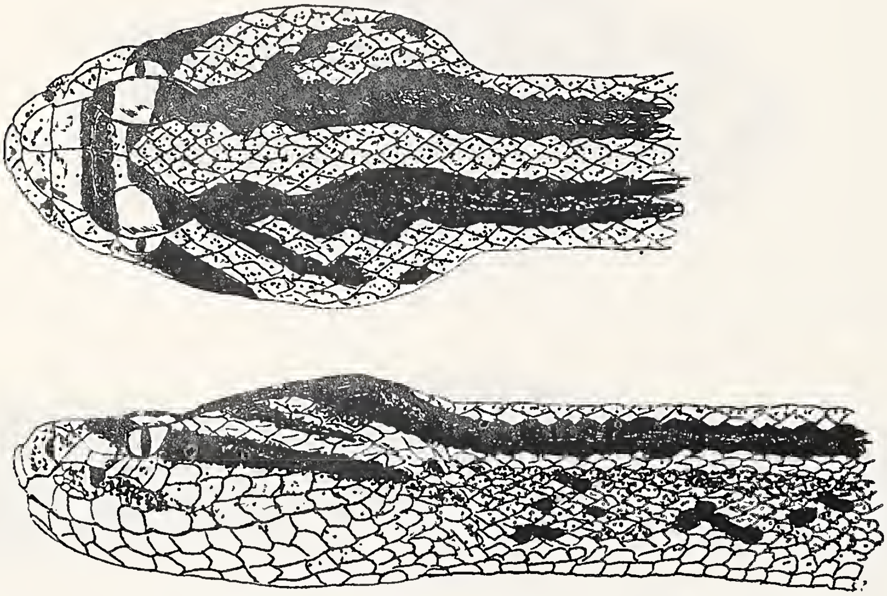

Fig. 8. *Crotalus d. marajoensis* - scattered black scales.
Range: Marajó Island, Brazil.

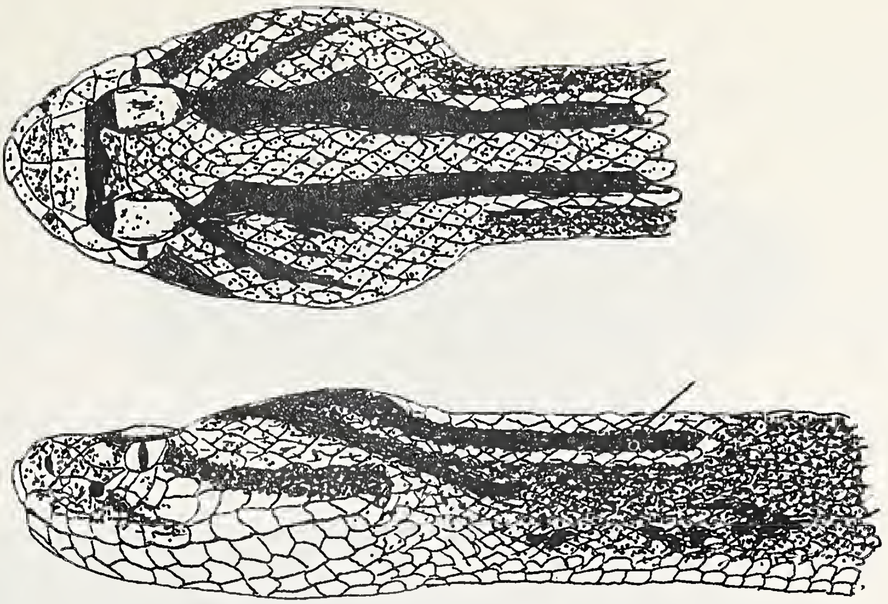

Fig. 9. - *Crotalus d. cascavella* - paravertebral nuchal stripes less than one head length.
Range: The dry caatinga regions of northeastern Brazil.

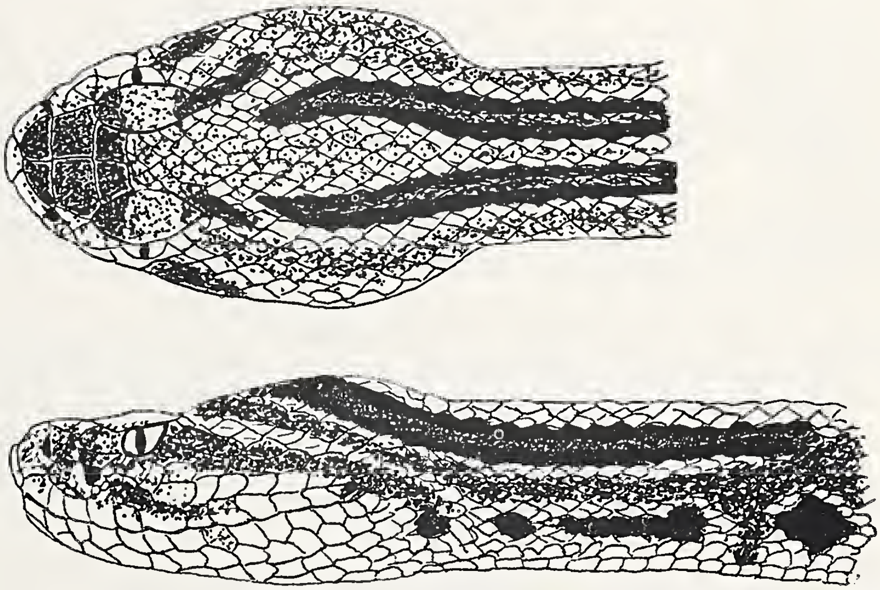

Fig. 10. *Crotalus d. collilineatus* - distinct paraventral stripe and supplementary paraventral spot.
Range: Northwestern Parana, western São Paulo, Minas Gerais, Districto Federal, Goiás and southwestern Mato Grosso, Brazil and extreme northeastern Paraguay.

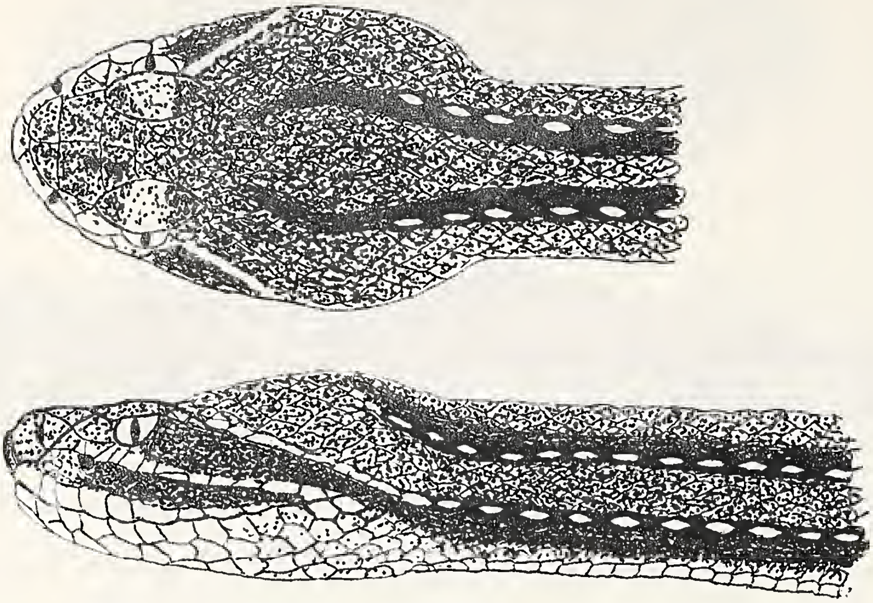

Fig. 11. *Crotalus d. terrificus* - dorsal head pattern indistinct.
Range: Rio Grande do Sul, Santa Catarina, Paraná, eastern São Paulo, eastern Minas Gerais and western Rio de Janeiro, Brazil; Paraguay, Uruguay, northern Argentina and Bolivia and extreme eastern Peru (via Bolivia).

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The Common Books On Reptile Care: A Comparative Overview Part II

by Anthony J. Kohler

CHAPTER 3 - TURTLES

1. Anonymous. *Turtle Facts*. Long Island City, N.Y. Wardley Products Co., Inc. Undated. 2 pp.
2. Charles E. Burt, Walter D. Landry. *My Baby Turtle*. Topeka, Kan. Quivira Booklets. 1954 8 pp.
3. Robert J. Church. *Turtles*. Jersey City, N. J. TFH Publications. 1963 64 pp.
4. Herndon G. Dowling, Stephen Spencook. *The Care of Pet Turtles*. New York. N. Y. Zoological Society. 1960 16 pp.
5. Richard Haas. *Enjoy Your Turtle*. New York Pet Library, Ltd. Undated. 32 pp.
6. Maxwell Knight. *Tortoises and How to Keep Them*. Leicester, England. Brockhampton Press. 1964 96 pp.
7. John M. Mehrtens. *Know Your Turtles*. New York. Pet Library Ltd. Undated. 64 pp.
8. Ivor and Audrey Noel-Hume. *Tortoises, Terrapins & Turtles*. London. W. & G. Foyle Ltd. 1954 112 pp.
9. Peter C. H. Pritchard. *Living Turtles of the World*. Jersey City, N.J. TFH Publications. 1967 288 pp.
10. Mervin F. Roberts. *Turtles as Pets*. Jersey City, N. J. TFH Publications. 1960 24 pp.
11. Hobart M. Smith. *Pet Turtles*. Fond du Lac, Wisc. All-Pets Books, Inc. 1955 24 pp.
12. Republished with more and different pictures as: Hobart M. Smith. *Turtles...In Color*. Jersey City, N. J. TFH Publications. 1969. 31 pp.
13. Donald W. Tinkle. *Playful Turtles*. Jersey City, N. J. TFH Publications. 1964 32 pp.

All of these are available through the normal pet trade channels except 2, 4, 6 and 8. The last of the four is available in this country but is hard to find. 6 is not, so far as I know, imported into this country.

Turtle Facts is subtitled "All about the CARE and MAINTENANCE of your PET TURTLE" - a large order for a two page leaflet. Due to the brevity of the leaflet, the usual categorical breakdown will be disregarded.

This pamphlet appears to have been written as a give-away to sell more of the company's products. The idea of changing the water every other day is good, as is a dry spot for the turtle. But the recommendation of keeping the water temperature between 75°F and 80°F is given simply because it promotes more activity and a better appetite, not because it is necessary for the turtle's life.

The diet recommendations are Wardley's Turtle Food alternated with their Ant Eggs. A less nutritious diet is hard to imagine. *Occasional* feedings of raw beef are also recommended; no mention is made of avoiding fat.

The pamphlet continues in this tone. The concern is not for the turtle or the owner, but rather the merchandising chain which leads back to Wardley's. As an example, for the diseases mentioned (eye trouble, fungus), the cures given are Wardley products and no mention is made of alleviating the conditions which cause the trouble.

My Baby Turtle has one advantage over the preceding leaflet: it is not trying to sell any particular company's products.

The paragraphs on caging are inadequate; aquariums are recommended, but the standard "turtle bowl" is given a green light.

Feeding instructions could be good if not for the mention of and agreement with prepared turtle food. The other foods mentioned would, if used instead, give the animal a chance to survive.

The temperatures given (75°-85°F) are correct, but not emphasized and, because of the lack of an explanation, are not likely to be afforded to the turtle. Also, no means of achieving these temperatures in any container too small for an aquarium heater is given.

The only diseases mentioned are eye trouble, fungus, and soft shell. The cures given may work, but ultra-violet treatment will give the best results (presupposing an adequate diet) and is not given as a cure.

No stand is taken on the practice of painting the shells of turtles; this is an avoidance of responsibility.

The explanation of breeding is limited to explaining where baby turtles come from.

There is no bibliography.

Turtles is a good book for the beginner. Its weak points are usually omissions, and the few misstatements, if taken as written, will hurt neither the reader nor his animals.

The problems with his discussion of caging are two: first, he says nothing against the standard "turtle bowl". To be perfectly fair, he says nothing about it at all, but some may take this as tacit approval. The second point is room--a standard 5-gallon aquarium considered sufficient for three baby turtles for one year, or one turtle for three years. Except for small turtles like *Sternotherus* and *Kinosternon*, this would be far too small after about 3 months.

What is said about feeding, and for terrestrial species, drinking, is good. A balanced diet is presented , and the emphasis on calcium is well-taken. The only problem is that dried turtle foods are said to be permissable "for variety". This may have been included at the publisher's insistence. Regardless, though, it would be most likely understood as approval.

Temperature is covered well. More emphasis could have been used, but the content is accurate.

The author attempts to cover those turtles normally found in pet stores, the commoner native varieties, and some of the less common species from the pet trade. The selection has changed recently, but enough information is given on each species to give the reader a chance to keep them alive and healthy.

The chapter on ailments covers the more common diseases of pet turtles, and its major failing is in not warning of cases which will not respond to treatment. There is, however, a commendable, extended discussion on how to administer medications orally.

The irresponsibility of the book, other than the statements discussed previously, is limited to the discussion of *Clemmys muhlenbergi*. No mention is made of the advisability of leaving specimens alone if their habitat is not in imminent danger of destruction. On the positive side, however, their desireability as pets is not emphasized.

The pictures within the body of the book are all used to illustrate species discussed in the text or the caging arrangements of the author. The "Pictorial Gallery of Exotic Turtles" at the end of the book is unfortunate, however, as it says nothing of how difficult the species are to maintain and may create a demand for them.

Breeding is only discussed in the general description of turtles.

The bibliography is short (4 books), but the only book which I would include over any of those four was not published at the time.

The Care of Pet Turtles is another good book. With both authors then in the business of caring for reptiles professionally, it should be.

The recommendations on caging advise aquariums or "turtle bowls" with 60W basking lights. If a "turtle bowl" must be used, the addition of such a light makes for a healthier set-up.

Feeding consists mainly of giving the zoo diet in what I would suspect is a simplified form, as it lacks vitamin supplements. These and calcium are mentioned if a meat other than chopped whole fish is used. Commercial turtle food is cited as having insufficient nutritive value, but the point is not stressed.

Temperature is handled well, but without what I consider to be the necessary emphasis.

The various water turtles commonly found in the pet trade are identified, and while the diet is sufficient for any, their other requirements (e.g., cold-sensitivity) are not covered.

Health problems, both real and imagined (e.g., moulting of shell laminae) are covered; the list covers the major complaints of novice turtle-keepers. It also gives simple cures which are as effective as any available to the beginner.

From the way the title is written, some information on terrestrial turtles would seem to be called for. Otherwise, the book is accurate and well-written.

The sole disappointment with the illustrations is that the pictures for identification of young turtles are only half-tone drawings, not photographs.

Breeding is mentioned; sketchy but sufficient instructions are given for hatching turtle eggs.

The bibliography, while short, is complete. However, at least for the purposes of further reading, I would question the inclusion of *Terrarienkunde*, particularly without stating that it is written in German.

Enjoy Your Turtle spends almost half the book describing turtles and how they function. The rest is unfortunately unemphasized, but gratifyingly accurate.

Caging is covered (albeit quickly) surprisingly well. The "turtle bowl" is discouraged if anything better is possibly available. Unfortunately, *Sternotherus* and *Kinosternon* are grouped with *Terrapene* for caging; this will cause problems.

Feeding is also covered well, considering space. The value of feeding whole animals for vitamins is unfortunately not mentioned. The other point is far too common--lettuce, when mentioned, is recommended without regard to variety (head, or iceberg, lettuce is nearly all water and effectively worthless nutritionally).

Temperature is again covered well and accurately, with good reasons. Again, however, more emphasis could be used.

The turtles most likely to be encountered are covered, but no specific differences in their care are noted.

The cures for diseases will no doubt work, but the ailments of reptiles are rarely as cut-and-dried as the author suggests. The ailments covered are the usual ones.

Other than the grouping of *Sternotherus*, *Kinosternon*, and *Terrapene*, and a recommendation to pick up all large snappers by the tail, the author seems to have fulfilled his responsibilities--once he got around to starting.

The pictures (18 full color, including a 2-page center spread) come close to overpowering the text. Some seem to serve little purpose other than window dressing, but they are accurately identified and not (quite) too plentiful.

Breeding is mentioned only in the introductory discussion on turtles and how they function.

There is no bibliography.

Tortoises and How to Keep Them was written by a well-known British naturalist. Unfortunately, well-known does not necessarily imply well-informed.

The discussion on caging is excellent for outdoor enclosures, but the author recommends foregoing the purchase of a tortoise if it must be kept indoors. I consider this to be unnecessary, but since the British sell (and treat) tortoises as we do red-ears, this may keep some tortoises from dying in that particular fashion.

Feeding is outlined well, but lettuce is merely given a low recommendation. As it is plain from the text that head lettuce is being referred to, it should have been completely discouraged. Also, after giving a list of acceptable plants, the instruction is given not to experiment with other plants--which should have been modified at least for specimens refusing to feed otherwise.

Temperature seems to be a typically British problem. What is most amazing is that the author states the following three points: the best temperatures are between 60°F and 70°F; the animals become inactive over 70°F; and mating only occurs during "really hot summers"--and cannot make the connection.

The coverage only extends to 4 species--*Testudo graeca, T. hermanni, Emys orbicularis,* and *Clemmys caspica leprosa.* No unusual requirements for them or any other species are noted, other than care of young.

The course of action suggested for virtually any ailment other than ticks is "take it to the vet". Perhaps the British veterinarians know more about tortoises than their American counterparts.

The author's statements, other than on temperature, are responsible--he apparently likes animals--but some of his other statements are surprising. For example, he states that a lack of calcium will lead to soft shell and *brittle* bones. He also refers to *Sphenodon* as a lizard--I believe that "lizard-like reptiles" would not only have been more accurate, but would have satisfied both the people who care and the people who do not.

The pictures (39 line and half-tone drawings) seem largely superfluous. However, they are not overpowering, and they do break up the text. The one point that arises is in a drawing showing the distinguishing points of *Testudo hermanni*--the supracaudal is not clearly shown to be double (which it is in *T. hermanni*) and the lamina identified as the supracaudal is actually the 5th vertebral. Yet the supracaudal is properly identified two pages previously.

There is a chapter on breeding, but in the discussion on incubating eggs, there is no reference made to maintaining the humidity established at the beginning, and there are so many cautionary notices against success that anyone other than a diehard would be discouraged.

There is no bibliography.

Know Your Turtles is a book which nearly requires superlatives to describe. While a number of points are neglected, they are all minor in comparison with most of the available works.

Caging is covered well. The "turtle bowl" is mentioned for use, but only as a very last resort. Its major faults are mentioned at the same time. The only point here which I feel is wrong is his recommended space--2 or 3 hatchling *Pseudemys* or a young Trionychid in a 2 1/2 gallon aquarium. I feel that this would be unnecessarily cramped.

Feeding and drinking are also well done, for all sizes of any major type of turtle. Romaine lettuce is specifically named as an example of "green lettuce". Unfortunately, head (iceberg) lettuce is not mentioned as worthless.

Temperature is handled very well, although as with most other sources, I don't consider it sufficiently emphasized as a general point. However, the need of tortoises for warmth in their substrate is very well emphasized.

Requirements which differ from the general ones given in the text are outlined for those species covered. The author does try to cover all the common pet species, and for the space used, does an exceptional job. While species not covered do commonly appear on the market now (notably *Siebenrockiella crassicollis*), it would be impractical to try to cover every available species. I feel the author has made an excellent choice.

The only ailments noticably absent from the discussion are ecto-parasites--leeches, mites, and ticks. The other ailments are all well covered, with easy but effective cures.

The author has apparently devoted much time and effort to this book, making it as accurate and complete as possible within the space limitations. In addition, he recommends either the International Turtle and Tortoise Society or himself for help with problems not covered by the book.

The pictures are attractive, accurately captioned and well-spaced. The only one to which I would take exception is the center-spread of a desert tortoise and a guinea pig sharing a lettuce leaf; it seems superfluous. On the other hand, such a center picture seems to be an informal trademark of the publisher, and the author may have had little say about it.

Two basic methods of hatching eggs are given by the author; both are at least as successful as any other.

The bibliography, for the purposes of the amateur, lacks only one book (*Living Turtles of the World*). This is understandable as they are published by competing companies.

Tortoises, Terrapins & Turtles is a good British book. It has two primary failings, from an American point of view, but these seem to be typical of British works.

Caging, as far as outdoor enclosures are concerned, are covered well. Indoor cages, other than for juveniles, are disregarded, but the British favor outdoor enclosures.

Feeding is covered adequately. The recommended diet base is lettuce (head lettuce, presumably), but enough other greens are recommended to make up the deficiency. The authors suggest that young tortoises be prevented from eating sand, but give no reasons. It is quite possible that some minor nutrients are acquired this way; their "apparent" success level tends to bear this out. From an American's viewpoint, the most amazing instruction here is not to "pamper" or "molly-coddle" one's pets, specifically tortoises. This is, however, in agreement with their preference to place the tortoises in their gardens and let them fend for themselves.

Temperature, again, is a major shortcoming. The recommended range for *Testudo graeca* and *T. hermanni* is 68°F - 80°F during the day; for "tropicals", 65°F-75°F constantly. This is low, and would almost certainly affect the animals' growth and does affect their mating.

The authors cover a wide variety of tortoises, many of which are hard to get, even in Britain. A number of the more general requirements are given, but little detailed information. On aquatic turtles, however, far fewer are mentioned.

The recommended cures for diseases and parasites cover only the most superficial infections; for anything serious a veterinary's services are recommended.

The authors try to be accurate and responsible. Unfortunately, they are not always successful. For example, they say "it seems that in *ornata (Terrapene ornata)* there is no specific eye coloration to provide a guide as to sex."

There are very few pictures, all of the authors' turtles. One standout is a picture of a small *Pseudemys scripta elegans* with a caption stating "fifteen year old male. Carapace 3 1/2" ". This strikes me as abnormally small, yet no mention is made of any such problems.

Breeding is discouraged as generally unfruitful, but a method of hatching eggs is described. The necessity of moisture for tortoise eggs is questioned; their reports indicate that it is not vital. However, the reader is instructed to sever the "umbilical cord" if the young tortoise fails to free himself--and yet every American source states that there is nothing worse that can be done.

There is no bibliography.

Living Turtles of the World is, for the purposes of the average layman, the last word in turtles. While more oriented toward the classification of turtles than anything else, it is included because it does have a section on the care of captive turtles, and also because it is mainly available through the pet trade.

Caging is covered quickly, but quite well. The best point made is the recommendation of 33 square inches for every linear inch of turtle; this is on the order of 3 times the space usually recommended.

The discussion on feeding is complete, but lettuce is recommended as a base without specifying variety. The other disappointment is a lack of warning against the commercial turtle foods of dried insects and ant pupae.

The temperatures given are good, and a statement that the water should remain at that temperature (at least during the day) is included. Unfortunately, there are few suggestions for achieving this temperature. More important, there is no warning about the low temperature that water in an open, unheated container will reach.

The book at least touches on all species and subspecies of turtles; its diversity cannot be denied. Some of the less well-known species have some of their habits and preferences noted, but by and large the information applicable to their captive care breaks down no farther than families.

Diseases and parasites are passed over rather quickly, but effective cures are given. A larger selection of cures and a more extended discussion of each problem would have been appreciated, but their lack is no reason for condemnation.

The author does warn at the beginning of the book that there was a long pre-printing delay, and quite a bit of revision was done. While no irresponsible points come to light, there is one curious inconsistency, notably unusual by its apparent uniqueness. In the text, *Hardella* is described as a monotypic genus, yet there are photographs identified as *H. thurgi* and *H. indi*.

Pictures are the highlight of the book. There are 150 color photographs, 66 half-tone photographs, and 5 line drawings. The author's apparent goal is to illustrate and describe every different form of living turtle known. While not completely successful, the author has done a remarkable job. Two points can be made about the pictures, however. First, several are technically poor--poorly focused (e.g., *Emys orbicularis*, p. 83), poorly exposed (E.g., *Clemmys insculpta*, p. 86), or poorly lit (e.g., *Pseudemys malonei*, p. 74). Second, many of the pictures do not lend themselves to use for identification purposes. These criticisms are not meant to detract from the recognition of a mammoth effort; they are merely meant as constructive criticism.

Breeding, for the purposes of the pet owner, is not mentioned.

The bibliography is extensive, including a number of books and papers. There is more for the systematist than the pet owner, but as this is the primary intention of the book, no criticism can be made here

Turtles As Pets is a barely adequate book. Reading it gives the impression that the author is running through it.

The discussion of caging is average. The "turtle bowl" is, while not mentioned by name, implied to be adequate. Also, a covered tank is recommended; this will tend to raise the humidity too high. A basking place, other than for Trionychids, is not specified, nor is any detail given to the proper housing setup.

Feeding is treated adequately. The only mention against the commercial dried insect and ant pupa turtle foods, however, are that they should not be given as a steady diet. Also, while Vitamin D in several forms is emphasized, no similar emphasis is given to calcium. Crushed snails and guppies, both mentioned as food, will supply sufficient calcium, but the other foods will require supplemental calcium, which is not touched upon.

Temperature, where covered, is given accurately. However, it is mentioned in passing, without any particular emphasis or discussion, except on a seasonal basis.

The author only covers a limited number of species in the genera *Pseudemys*, *Chrysemys*, *Graptemys*, *Malaclemys*, *Terrapene*, *Clemmys*, and *Trionyx*. Other than differentiating between *Terrapene* and *Clemmys* as opposed to the others, no special requirements are given for any.

The only ailments covered are fungus and malnutrition. These are covered very quickly and given short shrift.

The author has not accepted the responsibilities of a book on the care of animals. The author recommends keeping *Malaclemys* in fresh-water--which makes them very vulnerable to fungus infections. Some of the most important points--such as calcium--are brushed aside or ignored completely.

The pictures (23 half-tone photographs, 6 line and half-tone drawings) do not detract from the text. They do not add much, either. Also, the two pictures on page 23 are identified as "*Patemys ptycophatus*" and "*Podocremis unifilis*"; they are *Podocnemis unifilis* and *Platemys platycephala*, respectively.

Breeding, as mentioned, does not affect the turtle keeper.

There is no bibliography.

Pet Turtles is an average book. It has little to recommend it, although it is considerably better than its American contemporary, *My Baby Turtle*.

In the section on caging, an aquarium (10-gallon size) is said to be the best; my only regret is that the "turtle bowl" was not condemned. The aquarium arrangements suggested are novel, although neither would be easy to keep clean.

Under feeding, there is no mention of calcium, although the importance of Vitamin D is mentioned, especially indirectly. Dried turtle food is accepted as an adjunct to the normal food, with reasons. It could have been more strongly condemned.

Temperature is given accurately. Radiant heat is the preferred method; this should be supplemented with heated water. The emphasis is again slight.

The author covers most of the native turtles. The caging requirements of Trionychids are given, but there is no mention of salt for *Malaclemys*.

The only ailments mentioned are eye troubles and fungus. These are the most obvious, but hardly the only ones. The remedies given are simple and easily administered.

The author has apparently tried to write for children, and the result seems like a scientist trying to talk down but occasionally failing. The only complaint is the simultaneous usage of *Trionyx* (in text) and *Amyda* (with picture, p. 13).

The pictures (15 drawings) illustrate species mentioned in the text.

A method of hatching eggs is given, but a cautionary note of the possibilities of failure would be a desireable inclusion.

There is no bibliography.

* * *

Turtles...In Color is identical in text with the foregoing book. The pictures (23 color photographs, 3 half-tone photographs) are the only change of content. If anything, they detract.

* * *

Playful Turtles is a distinctly inadequate book. Four pages of the book, each with a picture taking up half or more of the page, deal with the care of turtles in captivity. The rest of the book is concerned with pictures, descriptions of turtles and their habits in nature, and suggestions on how to race turtles, using the publisher's turtle track. Due to the length of the discussion on captive care, the usual format will not be followed.

The information in the book will keep turtles in good health, if read very carefully and thought out extensively. Heat, for example, is recommended: "The temperature of your terrarium should be kept near 80°F". No suggestions are given for achieving this temperature.

Soft shell and fungus are the only diseases mentioned. The reasoning of the author on soft shell is particularly curious: it is caused by either, 1. lack of calcium or 2. lack of vitamin D--but not both, apparently.

The pictures do add a note of color (14 color photographs, 20 half-tone photographs) but must be taken with a grain of salt. A picture caption on turtle-riding mentions that "some sea turtles and some of the large terrestrial species are certainly large enough as this picture makes clear." The turtle pictured is *Podocnemis expansa*. Another caption says that hatchling sliders "like these" are the ones usually found in pet shops. They are *Pseudemys dorbignyi*.

The bibliography consists of a suggestion to read the publisher's other turtle books for more information.

1300 - 30th Street, B-1, No. 18, Boulder Co., 80303

Received 5 February 1972

A Feeding Observation On The Yellow-Bellied Water Snake, *NATRIX ERYTHROGASTER FLAVIGASTER*

At 2 PM, 16 March 1972, I was standing beside a roadside ditch about 15 miles north of Houston, Texas, near the Houston International Airport, when a 36-inch yellow-bellied water snake, *Natrix erythrogaster flavigaster*, backed out of the water with a 10-inch western lesser siren, *Siren intermedia nettingi*, grasped about mid-body. The snake lifted its head about 6 inches above the ground and crawled a foot and a half up the embankment to my feet where it began "walking" its jaws along the siren's body towards the head.

The siren attempted to escape by burrowing among the grass roots and by twisting movements that forced the snake to turn onto its back. The siren also uttered several shrill distress cries. Although the snake crawled across my boots several times during this struggle, it did not seem to notice my presence. After it had swallowed the siren, it raised its head about 6 inches, as though looking around, flickered its tongue for a few seconds, then crawled back into the ditch and swam away under water. The whole operation had taken about 45 minutes.

The ditch runs along the bottom of a roadside "borrow pit." The sides of the pit are covered with grass which is occasionally mowed by the highway department. The surrounding area is intermittent pine woods, cleared pasture, and housing development. The temperature was 74°F with bright sunshine.

—*Bill Marvel, 11554 Lockwood Drive, C-1, Silver Spring, Maryland 20904*

Received 2 May 1972

Additional Notes on the Turtle, *Chrysemys scripta* in Maryland

The turtle, *Chrysemys scripta* has been introduced into a number of localities in Maryland. Mansueti (1941) reported specimens collected near Cherry Hill and McMahon Quarry, Baltimore City, and Glenartney, Patapsco State Park, Baltimore County. Cooper (1959, 1961) also reported this turtle from Lake Roland, Prettyboy Dam and Loch Raven reservoir in Baltimore County, and from Wagners Pond in Anne Arundel County. Harris (1969) included localities in Prince George's (Nr. Hyattsville, per. comm.) and Washington (D.O.R. on Rd. to Woodmount, just off US Rt. 40, per. comm.) Counties.

Recently, twelve specimens of *Chrysemys scripta* from Frederick County, Maryland were shown to me by Mr. Bruce-Allyn Lawrence. These specimens, collected by

Mr. John Eaton in several of his ponds along Fish Hatchery Road just north of Route 15 between July and September, 1971, all have the red supratemporal stripe characteristic of *Chrysemys s. elegans*. According to Mr. Eaton this population has grown from "pet turtles" released by local residents. The species is evidently well established in this area for it has been known by Mr. Eaton for the last five to ten years. Overflow from this population may account for a juvenile *Chrysemys scripta* that I collected in the Monocacy River below Route 40 in September, 1968. The ponds on Mr. Eaton's property, and numerous other ponds in the area, empty into the Monocacy and it is possible that this juvenile could have originated in one of the ponds on Fish Hatchery Road. Additional observations along this portion of the Monocacy River will demonstrate whether *Chrysemys scripta* has become established there.

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— John D. Groves, *Reptile Department, Baltimore Zoo, Baltimore, Maryland 21217.*

Received 21 May 72

An April Birth Record for *Crotalus lepidus* with a Summary of Annual Broods in Rattlesnakes

Klauber (1956: 695) summarized birth dates for various rattlesnake species based on 119 broods (Fig. 1. & 2.). These data support that from June through October appears normal for most species. His data are based on captive as well as natural records. He concludes that captive dates cannot be depended on to give natural-birth dates with complete accuracy because of the artificial temperature conditions unless the females have been collected shortly before the births occurred. Some of his records are from zoo breedings (ex. *Crotalus atrox, Crotalus s. scutulatus* x *unicolor* hybrids), but most appear to have been records of broods just born in captivity. June through July may be normal for some of our neotropical species such as *C. unicolor, C. vegrandis, C. d. cumanensis*. October and November may be normal for species such as *C. cerastes* occurring in our hotter desert areas. But most, as Klauber points out are from August to mid-October, usually centering around mid-September. Birth records available for *C. l. klauberi* include July and August. Klauber (1956: 298) suspected "off-season" spring broods in *Crotalus viridis helleri* but was unable to substantiate them.

It is known that rattlesnakes bear young annually and biennially depending on the climatic conditions of their habitat. Rattlesnakes in southern United States normally bear young annually, whereas the snakes in areas with more rigorous climates usually produce biennial broods. With biennial broods an early birth can be effected since the eggs are well developed by the second spring. Klauber (1956: 687) reported that it is possible in territories where annual and biennial cycles occur that the smaller females may have young at two-year intervals while the larger females may be able to bring a brood to full term within a year.

An adult female *Crotalus lepidus maculosus* x *klauberi* (71-261 HSH) collected 24 August 1971 by Mr. Terry Basey in a canyon N. of Coyotes, Durango, Mexico, gave birth to 1 young 14 April 1972. She had been maintained in the laboratory at temperatures between 25 and 30° C since collection. The female measures 41.2 cm total length (2 9 cm tail length), and has six rattle segments of equal width (no button) indicating she is a mature female. The juvenile measures 17.5 cm total length, and is patterned exactly like the adult female. *Crotalus lepidus maculosus* is a stunted race. Tanner, et. al. (1972: 16) point out that this area is some of the most rugged terrain in Mexico with diverse climate ranging from wet to dry. It is therefore possible that biennial broods are the rule here, with a relatively early births to assure survival of the young. The fact that biennial broods are the rule here and conditions of captivity caused the early birth or that this birth was the product of an off season mating can not be ruled out.* Additional observations are needed in this area of their biology as the life histories of animals from this remote and inaccessible area are almost completely unknown.

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* Sperm storage is another factor which can not totally be forgotten.

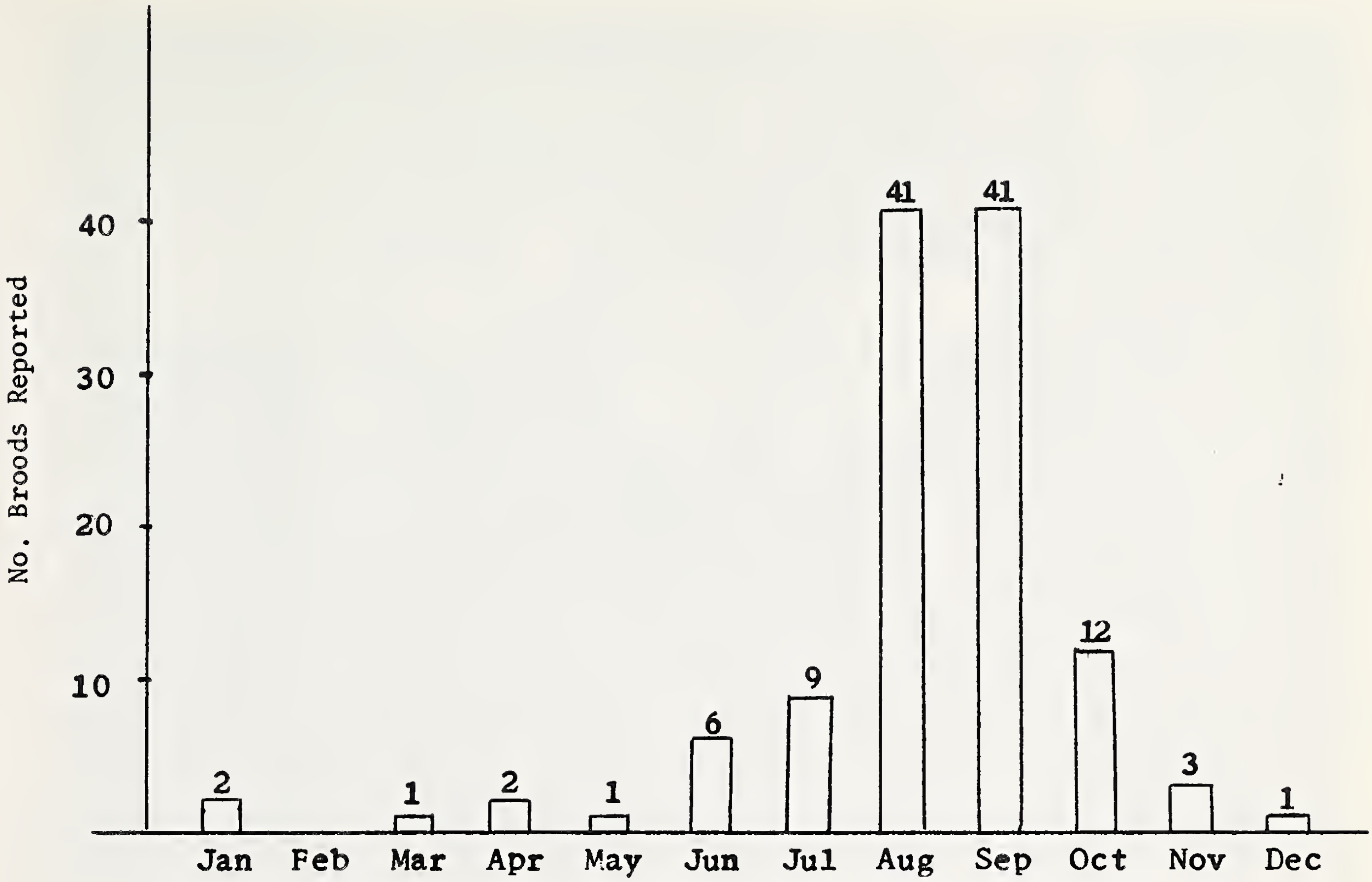

Fig. 1. Summary of 119 broods reported by Klauber (1956).

JANUARY - *C. r. lucasensis*, *C. s. scutulatus* x *unicolor* hybrids*

MARCH - *C. s. scutulatus* x *unicolor* hybrids*

APRIL - *C. unicolor*,* *C. s. scutulatus* x *unicolor* hybrids*

MAY - *C. unicolor*

NOVEMBER - *C. cerastes* ssp., *C. c. laterorepens*

DECEMBER - *C. t. triseriatus*

Fig. 2. Summary of "off season" births by species
(*based on captive breedings)

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—Herbert S. Harris, Jr. and Robert S. Simmons, *Department of Herpetology, Natural History Society of Maryland, 2643 North Charles Street, Baltimore, Maryland 21218.*

Received 22 May 1972

News and Notes

EASTERN SEABOARD HERPETOLOGICAL LEAGUE

On Sunday, April 23, 1972, delegates from six Eastern herpetological societies and associations -- Connecticut, Maryland, New York, Northern Virginia, Philadelphia, and Virginia -- met at the home of Mal Skaroff, PHS president, and discussed cooperation among their various groups. I. Gilboa, representing Herpetological Information Search Systems (HISS), American Museum of Natural History, attended as observer.

This meeting resulted in the formation of the Eastern Seaboard Herpetological League (ESHL). The name represents a compromise, reflecting geographic orientation without unnecessarily restricting participating groups to any hard and fast boundaries. The name also indicates a non-hierarchical structure: ESHL is not a federation; it is a confederation, and none of the constituent organizations has given up any autonomy. Membership in ESHL is strictly voluntary and is open to established regional herpetological societies, clubs, and associations within this geographic area. At present, MdHS, NYHS, NVHA, PHS, and VaHS are fully participating member groups; CtHS is participating provisionally pending decision of their membership. A special invitation was extended to the Massachusetts Herpetological Society (MaHS), and prospects for their joining appear good.

DELEGATES TO THE EASTERN SEABOARD HERPETOLOGICAL LEAGUE (ESHL) ORGANIZATIONAL MEETING ON EARTH DAY, 23 APRIL 1972 (listed in alphabetical order, not as shown): J. Couch (PHS), T. Feuerbach (NVHA), R. Gaskill (CtHS), I. Gilboa (HISS), J. Green (PHS), H. Hance (PHS), D. Hulmes (NYHS), P. Hulmes (NYHS), R. Jennings (VaHS), W. Marvel (MdHS), T. Moore (NVHA), M. Skaroff (PHS), M. Thomas (NVHA), R. Tuck (MdHS), M. Velay (PHS), F. Watrous (NVHA), P. Wemple (MdHS), and photographer J. Robinson (PHS).

ESHL went on record in support of the HISS bibliographic project and *Herpetological Review* to the extent that, if necessary, the League will provide (1) a letter documenting support, and (2) token financial support. Subscriptions to *Herpetological Review* and membership in the Society for the Study of Amphibians and Reptiles (SSAR) and/or the Herpetologists' League (HL) will continue on an individual basis, as opposed to society subscriptions or memberships.

Primary objectives of ESHL are to discuss and coordinate joint or individual herpetological projects involving species whose ranges cover areas shared by the constituent groups, including conservation and protection of rare and endangered species, and other related areas of concern, such as imported rare and endangered forms. Furthermore, in order to improve communications and information-sharing between participating groups, it was agreed to exchange publications, bulletins, journals, and newsletters on a continuing, mutual basis.

ESHL will hold two meetings annually: early March and late October. The first official ESHL meeting will be on Sunday, October 29th, 1972, at Columbia Union College, Takoma Park, Maryland, and will be jointly sponsored by MdHS, NVHA, and VaHS.

ESHL elected two officers to carry out its program. They are Robert G. Tuck, Jr., (MdHS president) as Coordinator, and Margaret M. Thomas (NVHA Co-Chairman) as Secretary.

—Margaret M. Thomas, Secretary, ESHL, *1611 31st Street, N.W., Apt. 104, Washington D.C. 20007.*

Received 28 May 1972

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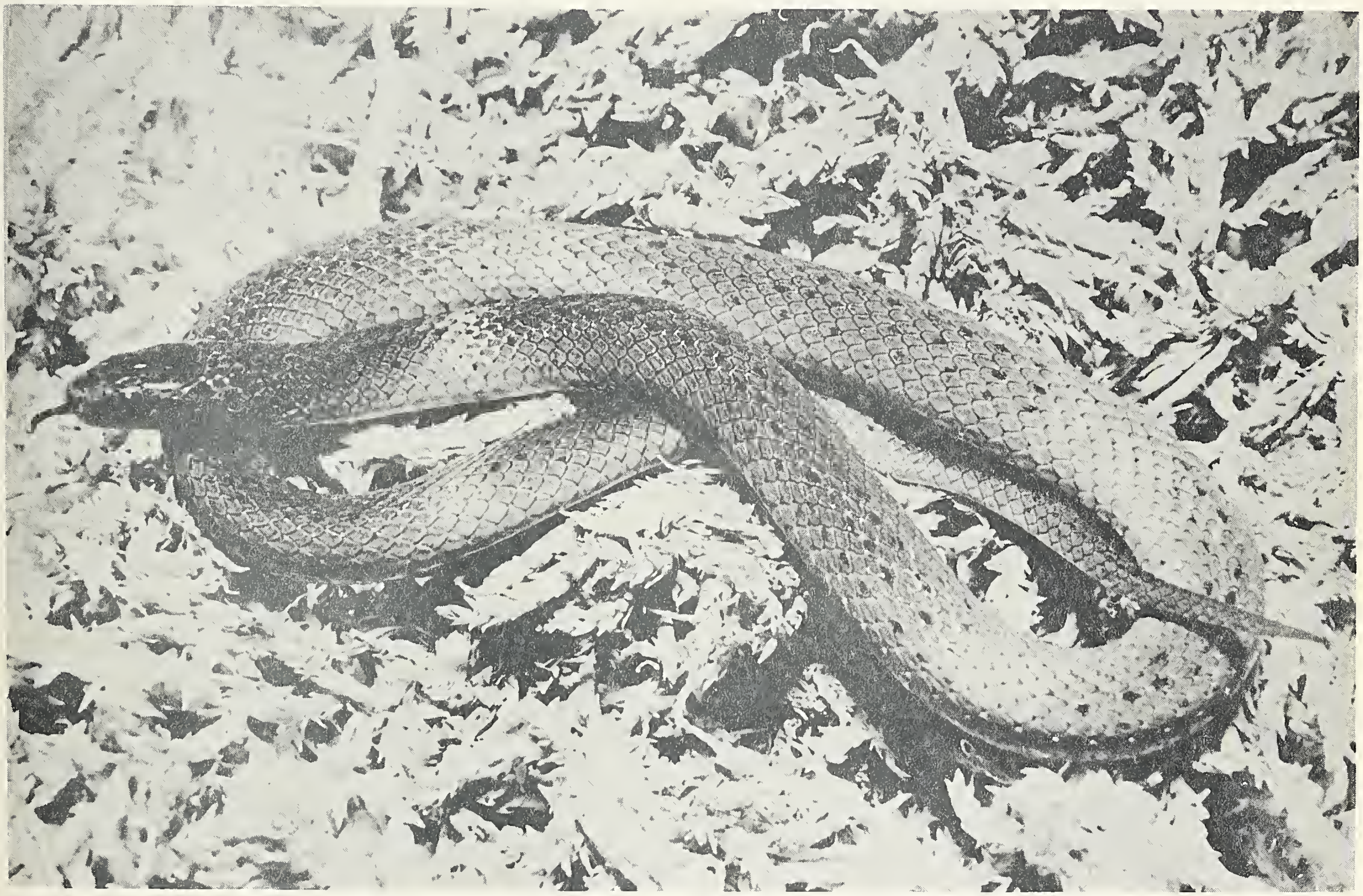

SEPTEMBER 1972 VOLUME 8, NUMBER 3

Bulletin of the Maryland Herpetological Society
Volume 8 Number 3 September 1972

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The Cover: A specimen of *Virginia valeriae valeriae* from Maryland. Photography by Dr. Robert S. Simmons.

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The Maryland Herpetological Society, Department of Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

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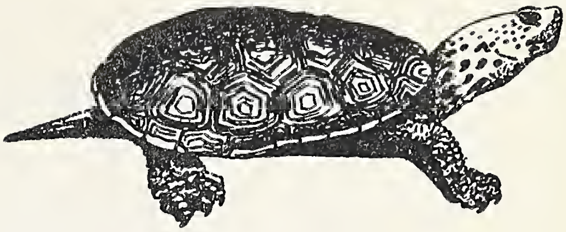

Volume 8 Number 3 September 1972

The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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An Instance of Cannibalism in Captive *Crotalus viridis helleri* with a Brief Review of Cannibalism in Rattlesnakes

Two young Southern Pacific rattlesnakes (*Crotalus viridis helleri*) were captured alive 26 November 1971 from under the ruins of an abandoned wooden building near the United States International University, Elliott Campus, San Diego, California. Each of the specimens measured approximately 260 mm in length. Klauber (1936) reported the young of rattlesnake species having an ultimate length of 1220 mm (such as attained by adult *C. v. helleri*) will be about 265 mm at birth. Each of the specimens had only the button indicating that they were newborn.

On 7 February 1972 after being in captivity without prey for almost nine weeks, one of the two died, apparently of starvation. Klauber (1936) noted that adults live up to a year in captivity without food. I have observed newborn *C. v. helleri* living 6 months in captivity without food. Two days later, on 9 February 1972, the second rattlesnake devoured the remains of the first in the usual manner, head first. Almost 4 weeks later, on 4 March 1972, the first rattlesnake was found regurgitated on the floor of the terrarium. The carcass appeared somewhat wrinkled with the forward 1/4 being partially digested. The latter 3/4 showed no signs of digestion.

According to Klauber (1956) one prairie rattlesnake (*C. v. viridis*) ate another that had been a cage-mate for several years. Both were adults and of similar size. The meal proved too large and was regurgitated. Bullock (1971) reported a similar occurrence in which a young *C. v. viridis* ate another, tail first, and regurgitated it one week later.

In other instances, Klauber (1956) reported that a *C. r. ruber* ate a *C. v. helleri*, a *C. v. helleri* ate a *C. m. pyrrhus*, and a *C. atrox* ate a *C. m. molossus* that may have died just before it was eaten. Williamson (1971) reported that a young *C. lepidus klauberi* ate a brood mate. Five days later it, in turn, was eaten by the maternal female.

From these observations one may conclude that rattlesnakes will on occasion turn to cannibalism. In this instance the size of prey appeared to be too large for digestion, although some nutritional value was derived as evidenced by the remains of the regurgitated rattlesnake's carcass. The *C. v. helleri* measured approximately 8 mm longer on 15 March 1972.

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——Arnold Powers, *United States International University, Elliott Campus, San Diego, California 92124.*

Received 24 June 1972

Dusky Salamanders and the Alleghany Front of Maryland

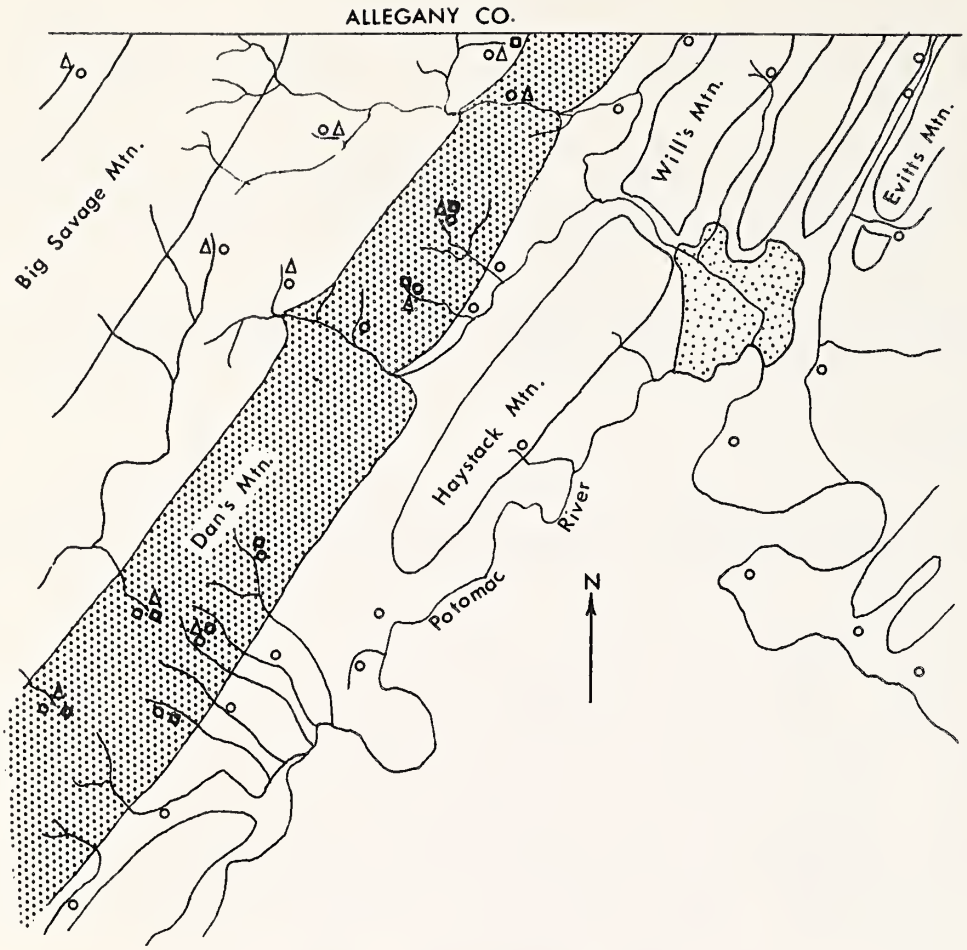
In Maryland dusky salamanders are represented by three species (*Desmognathus fuscus, D. monticola, D. ochraphaeus*). Prior to 1960, the distributions of these salamanders in the state were unknown. Cooper (1960) was the first to restrict the ranges of the seal salamander, *Desmognathus monticola,* and the Alleghany Mountain salamander, *Desmognathus ochraphaeus,* to the Alleghany Plateau of Garrett and Allegany Counties. Recent collections of *Desmognathus* from Allegany County have shown that *D. monticola* and *D. ochraphaeus* are indeed restricted to the Alleghany Plateau in Maryland and that the Alleghany Front serves as the eastern terminus of their range. The purpose of this paper is to illustrate the abruptness of this boundary and to comment on the possible types of ecological barriers which may exist.

The Alleghany Plateau, a rolling upland which has been dissected by numerous streams, encompasses all of Garrett County and a small portion of Allegany County. Its eastern edge is formed by Dan's, Piney and Little Alleghany Mountains. Collectively these mountains are commonly referred to as the Alleghany Front. Most of the plateau is over 2000 feet elevation with some ridges reaching 3000 feet elevation. The Alleghany Front represents the escarpment to the plateau. Other than the Potomac River, two streams have cut deep valleys into its rather precipitous eastern face. One is formed by Jennings Run in the north near Barrelville and the other, by Braddock Run near Clarysville in the central portion. Both streams flow into Wills Creek, west of the Narrows at Cumberland. From their headwaters near Frostburg to their confluence (as Wills Creek) with the Potomac River, there is an elevational difference of nearly 1400 feet. Upon entering the Ridge and Valley, a series of parallel ridges and valleys, these streams become slower, warmer, and more silted. The ridges and their adjacent valleys are much drier than those on the Plateau. Only the trunk streams in the larger valleys flow during the dry months. Streams on the ridges flow only during rainy spells. Some valleys are floored with limestone hence much of the drainage is subterranean.

Climatically, the Ridge and Valley is generally drier and warmer than the Plateau. The western portions of the Ridge and Valley, particularly the LaVale and Cumberland valleys and Wills and Haystack Mountains, receive less than 38 inches of precipitation annually whereas the Plateau, a short distance away, may have as much as 48 or more inches! This is due to a "rainshadow" effect. Moist winds sweeping over the high Alleghenies from the Mississippi Valley are cooled over Garrett County and the precipitation falls there. The number of permanent streams and the type of vegetation reflect the difference in the amounts of rainfall in each area. Hemlock, rhododendron, eastern larch, and red spruce characterize the wetter portions of the Plateau whereas in the Ridge and Valley these species are virtually non-existent (except for a few isolated stands). There, likewise, is a large temperature difference between the two areas. The Plateau experiences over 160 days below freezing and only 2 days above 90°F annually whereas the Ridge and Valley at Cumberland has only 111 days below freezing and 44 days above 90°F. Cumberland and its adjacent valleys and ridges comprise one of the hottest, driest areas in Maryland. (Vokes, 1957).

The distribution of dusky salamanders in Maryland is apparently related to permanency of the stream, stream gradient, water temperature and siltation. The ubiquitous northern dusky salamander, *Desmognathus fuscus*, can occur in most lotic habitats in the region whereas the seal salamander, *D. monticola*, and the Alleghany Mt. salamander, *D. ochraphaeus*, are confined to particular streams on the Plateau. The two confined species apparently have rather stringent ecological requirements. Ideally, *D. monticola* and *D. ochraphaeus* prefer heavily shaded, rocky, shallow, swift-moving, unpolluted, permanent streams.

On the Plateau, both the seal and Alleghany Mt. salamanders are widely distributed and are found on both sides of the Continental Divide. Along the Alleghany Front, they are known from several streams which originate on the eastern slopes of



MAP. Distribution of dusky salamanders along the Alleghany Front of Maryland

Legend --

○ *Desmognathus fuscus*

△ *D. ochraphaeus*

□ *D. monticola*

shaded area represents the Alleghany Front

dotted area represents the city of Cumberland of Dans and Piney Mountains and from the upper portions of Braddock and Jennings Runs (Map 1). They do not occur in the lower reaches of these streams or in any streams in the Ridge and Valley. The LaVale Valley seems to be an effective barrier to the eastern movement of both the seal and Alleghany Mt. salamanders.

The eastern terminus of the range of *Desmognathus monticola* and *D. ochraphaeus* is abrupt. The low average rainfall and the hot summers in the LaVale and Cumberland valleys are apparently responsible for the exclusion of these salamanders from the Ridge and Valley. Streams in these two valleys are either too large, too slow, silted, or intermittent. Except in a few isolated areas ideal habitats and even marginal ones are lacking. Portions of Murley Branch, Flintstone and Town Creeks, all within the Ridge and Valley area east of Cumberland, seem ideal but no seal or Alleghany Mt. salamanders have been found in any of these areas. Rocky Gap Run, a tributary of Evitts Creek, is located in a deep, well shaded ravine having dense growths of hemlock and rhododendron. Stream conditions appear excellent yet only *D. fuscus* occurs there. The LaVale and Cumberland valleys seem effective barriers; not allowing the less tolerant species to invade favorable habitats farther east.

As more information is gathered concerning other animal species, we may see that other species have similar distributional patterns. There is a great need for additional collecting along the Alleghany Front in order to sort out such problems in Maryland natural history before man has a chance to alter further this extremely interesting area.

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1957. Geography and geology of Maryland. Md. Geol. Survey, Bull. :19., v-243.

——Richard Franz, *Division of Natural Sciences, Florida State Museum, Gainesville, Florida, 32601.*

Received 13 July 1972

Salamanders in a Mississippi Cave

Moonshine cave is located in southern Mississippi, 14 miles NW of Waynesboro, Wayne County. This cave is interesting from a biological standpoint since four species of salamanders have been observed there: *Plethodon glutinosus, Desmognathus fuscus, Eurycea longicauda,* and *Eurycea bislineata.*

Black (1971) lists *Plethodon glutinosus, Eurycea lucifuga, Eurycea longicauda,* and *Typhlotriton spelaeus* as frequently being found in the caves of northeastern Oklahoma. Black describes what appears to be a fairly distinct niche separation between these four salamanders in Oklahoma caves. Knight (1969) lists *Plethodon glutinosus, Eurycea lucifuga, Eurycea longicauda, Pseudotriton ruber,* and *Gyrinophilus porphyritious* as being found in a cave in northern Alabama and describes the niches of these salamanders.

The four species of salamanders in Moonshine cave were observed on 5 July 1972. The salamanders were located in the twilight zone on the floor of the cave. There does not appear to be a distinct niche separation between these four salamanders. This area is worthy of additional investigation.

Specimens of the species mentioned have been deposited in the museum of University of Southern Mississippi. I would like to thank John A. Plyler for his assistance in the field.

Literature Cited

Black, Jeffrey H.
1971. The Cave Life of Oklahoma A Preliminary Study: Oklahoma Underground 4: 27-31.

Knight, E. Leslie.
1969. Salamanders in an Alabama Cave: Bulletin Maryland Herpetological Society 5: 84.

—E. Leslie Knight, *Department of Science Education, University of Southern Mississippi, Hattiesburg, Mississippi.*

Received 18 July 1972

Necturus in Maryland

On the evening of 25 July 1972 I collected three adult mudpuppys from the Youghiogheny River near Sang Run, Garrett Co., Maryland. To the best of my knowledge this salamander has not previously been reported from the state. One specimen is catalogued A-2770NHSM, in the herpetological collection of the Department of Herpetology, Natural History Society of Maryland.

—David S. Lee, *Department of Mammalogy, Natural History Society of Maryland, Baltimore, Maryland.*

Received 28 July 1972

The Common Books on Reptile Care: A Comparative Overview-Part III

by Anthony J. Kohler

CHAPTER 4 - SNAKES

1. Carl Kauffeld. *Snakes: The Keeper and the Kept*. Garden City, N. Y. Doubleday and Co., Inc. 1969 248 pp.
2. Ira Nowinsky. *Enjoy Your Snakes*. New York. Pet Library Ltd. 1967. 32 pp.
3. Marvin F. Roberts. *Snakes*. Jersey City, N. J. TFH Publications, Inc. 1957. 34 pp.
4. Hobart M. Smith. *Snakes As Pets*, 3rd Ed. Jersey City, N. J. TFH Publications, Inc. 1965. 126 pp.

Snakes: The Keeper and the Kept is the only one of these books which is not available through normal pet trade channels.

Snakes: The Keeper and the Kept is informative when talking about keeping snakes in captivity. Unfortunately, a large part of the book (162 pages) is devoted to the keeper (i.e., the author) and his personal experiences, usually snake hunting.

Caging is covered very well. The desirability of a small cage for snakes is thoroughly discussed, although the occasional advisability of large cages should have been mentioned. It may have been omitted on the theory that the error is usually toward overly large cages. However, throughout the entire discussion of captive care, individual traits are given high priority, which helps amend the lack.

Feeding, particularly for native snakes, is given complete coverage. There is a thorough discussion of feeding techniques early in the book, and an appendix containing an apparently complete list of native genera and their foods.

Temperature is well-done. The emphasis is strong; the only omission is a warning about substrate temperature as compared to air temperature.

The author discusses the boa constrictor in the original chapters on captivity. This is apparently done because (1) it is a popular pet, and (2) the techniques are similar for most snakes. The first appendix then goes on to list American genera and their requirements--food and caging--in good detail.

Ailments are given the most exhaustive treatment I have seen outside of a specialized work.

The author has tried to fulfill all the responsibilities of such a book--except, perhaps, to the person who expects 248 pages on the care of snakes in captivity. Inaccuracies are all very minor omissions, and there are very few of these.

Many of the pictures are not concerned with the care of captive snakes but rather with other parts of the book. Those that do pertain are clear, well-executed, and carefully and completely labelled.

Breeding is outlined sketchily, giving mainly the requirements and allowing the reader to choose his own method.

The bibliography is good, but short.

Enjoy Your Snakes was apparently written by an Eastern amateur.

The recommended cage is an aquarium tank, specifically the ten-gallon size. As an all-around size, this is adequate, but no mention is made of suiting the size of the snake to the size of the cage.

Feeding would have been covered well but for a few points. First, the author recommends keeping king snakes and boa constrictors on one mouse a week until they reach about 5 ft.--by the time they reach that length, they should have been getting two mice weekly at least since they were 4 ft. long, if not earlier. Second, the implication is made that mice can only bite snakes at night--an open invitation to day-time problems. Third, freezing fish is recommended as a way of storing it, but no mention is made of thawing it before offering it to the snake. And last, no mention is made of the nutritional value of whole animals. It is implied that a snake which accepts cut meat can be fed only cut meat indefinitely with no problems.

Temperature is not greatly emphasized but in this case it is perhaps better so. For a homemade cage, 12"x12"x20", a 60-watt bulb is recommended, and for a ten-gallon aquarium, 2-50 watt bulbs. This is certain to be fatal.

The only snakes covered in the text are those most commonly kept as pets in the Eastern U.S. and none have any special requirements.

The only diseases and parasites mentioned are mouthrot, respiratory infections, and mites. Better cures exist for mouthrot and mites than are given, and a zoo veterinarian would be just as able as any other to get "wonder drugs" for respiratory ailments, and much more qualified to give advice.

This book seems excessively full of inaccuracies and emotionally charged statements. As an example, the author states that there are about 114 kinds of snakes in this country, but only 4 are poisonous. Using the proper figures, the numbers would be 114 and 19. Another example is the advised treatment for snakebite: apply a tourniquet between the wound and the heart at the moment of the bite and cut open the wound to encourage bleeding. This gives four most probable methods of dying: gangrene, exsanguination, a heart attack caused by the fear of being too slow, or a heart attack from the bite of a garter snake, as no mention is made of how to distinquish various snakebites. It also introduces problems in the case of a bite on, say the head, although it could be said that the effects of a tourniquet around the neck of any person permitting it could not possibly be deleterious. Also, as a minor point to the publisher: if a hognosed snake refuses to roll over and play dead, printing its picture upside down is not an effective substitute (see p. 19).

The pictures (21 color photographs, 1 half-tone photograph) are attractive, excluding those taken by artificial light (color tinting). However, as many of the species shown are not described in the text, and vice versa, they tend to confuse the issue.

Breeding is not mentioned.

The bibliography is composed of two references; better books are available.

Snakes is a disappointment. The author spends too much space on which snakes to get and not enough on what to do with them afterwards.

The section on caging has two big faults, other than its shortness: First, the author advises screening any open sides in an aquarium tank meant as a prospective cage, but he fails to mention the abrasive effect of metal screening. Second, earth is recommended as a substrate. While wood shavings or bark shreds are worse, any organic material (including earth) is undesirable. Pea gravel is much better.

The best part of the discussion on feeding is the list of do's and don'ts. The most noticeable failure is the lack of a cautionary note about thawing frozen food.

Temperature is quickly passed over.

The book contains several diversified requirements, particularly concerning food. Unfortunately, no particular snakes are matched to these requirements.

Ailments are not mentioned.

The author seems more preoccupied with selling books than keeping snakes. Two particular points: the author puts a lot of emphasis on "spitting snakes", much more than is called for in such an uncommon (although admittedly spectacular) phenomenon, and while the author advises releasing snakes which refuse to feed, there is no warning about when or where not to release them.

The 19 half-tone photographs are interesting and do not detract from the text. Sadly, they don't add to it, either.

Breeding is given the same quick treatment as the other aspects of care.

The bibliography, which is of authors' names (Ditmars, Oliver, Pope) rather than books, would be of help to the frustrated reader.

Snakes As Pets is an excellent book. Its most serious drawback is the fact that it was written as a child's book.

Caging is well covered, but there are a few minor points which could have been handled better. First, in the construction of home-built cages, a sliding glass front is advised. It would be preferable to cover the edge of the glass for instance with tape, unless the edge has been smoothed. Second, a hiding place is said to be unnecesary though some snakes appreciate it. However, with some more tempermental individuals, it is necessary. Some clarification would improve this. Last, a number of substrates are mentioned, but no preference is given to gravel or newspaper, both of which have an advantage in cleanliness (gravel can also be more easily sterilized) over most substrates.

Feeding is also done admirably. The only problems here are first, the author says "most species require live food, yet Kauffeld (*Snakes: The Keeper and the Kept*) states that most snakes will accept prekilled food, and many prefer or even demand it. Second, under "assist-feeding", the author recommends coating the tube with either cod-liver oil or vaseline; I believe that vaseline would be a poor choice in comparison with cod-liver oil.

Temperature is given accurately, but without special emphasis. However, since only native species are discussed, the point is not as vital as with tropical species.

The author covers all the native non-poisonous snakes, giving the requirements of at least those which are the more tolerant of captivity. Some of the more specialized requirements that other authors mention are omitted, for example the apparent need of some of the larger *Natrix* to swim for their food. However, the snakes so slighted are generally not suitable for children's pets, although the demand could be created by their mention. The various requirements are available in books included in the bibliography.

The discussion of diseases and parasites has only one noticeable omission. There is no mention of ticks.

The author has written a highly acceptable book for younger readers on the care of captive native snakes. There are, however, three points to mention. The first is minor: a snake in one picture is identified as *Pituophis catenifer sayi*, while another is identified as *P. melanoleucus affinis;* agreement would be preferable. The second point could be more important: the author states that native constrictors of any size are not dangerous, even to children. A mention should be made here about the inadvisability of letting any constrictor become wrapped around a person's neck. The last point concerns the question of adult supervision, which the author recommends for young people with rodent-eating snakes. I would extend this to include any snake, for the snake's safety as much as the owner's.

The pictures (39 half-tone photographs, 29 half-tone drawings) are helpful in illustrating the text, but for those showing particular species or identifying points, color photographs would be preferable.

A standard method of hatching snake eggs is given. However, the inclusion of other effective methods would add more versatility.

The bibliography is complete and very highly detailed.

CHAPTER 5 - LIZARDS

1. Glenn E. Burghardt. *Iguanas As Pets*. Jersey City, N.J. TFH Publications, Inc. 1963. 24 pp.
2. Blanche G. Greenberg. *Pet Chameleons*. Fond du Lac, Wisc. All Pet Books, Inc. 1956. 24 pp.
3. Kay Ragland, Louise Brown Van Der Meid. *Horned Toads as Pets*. Jersey City, N.J. TFH Publications, Inc. 1961. 16 pp.
4. Ray Pawley. *Geckos As Pets*. Jersey City, N.J. TFH Publications, Inc. 46 pp. 1966. 46 pp.
5. Mervin F. Roberts. *Chameleons As Pets*. Jersey City, N.J. TFH Publications. Inc. 1957. 24 pp.
6. Earl Schneider, Ed. *Enjoy Your Chameleon*. New York. Pet Library Ltd. Undated. 32 pp.

All are available in the pet trade.

Iguanas As Pets is no more than adequate.

The paragraphs on caging do mention the need for exercise, such as from climbing. However, while the largest cage possible is recommended, the minimum sizes are too small. For a baby, the minimum dimensions, relative to the lizard's length, are 1.67x1x1 (cage length x width x height). For a large adult, this drops to .85 x .85 x .43. The next problem is that, while the lizard's eating any plants in his cage is mentioned, the considerable wear and tear from his attempting to climb on them is not. Lastly, while allowing the animal to run free in the house is mentioned, the rather copious evacuations of the lizard are not.

Feeding has two shortcomings. Head lettuce, although with other greens, is recommended, and the only meats specified are mealworms and catfood. However, almost any kind of meat is acceptable--heart, kidney, liver, canned dog food, ground beef. and turkey, for example.

The proper temperature is given, but the basic reason for it (the physiological need) is not explained and it is not emphasized.

The author mentions several other species of iguana, most of which are rarely available--genera such as *Dipsosaurus*, *Cyclura*, *Ctenosaura*, and *Amblyrhynchus*. He gives a brief summary, usually inadequate, of the needs of each.

Health problems, particularly mites, are dealt with in some detail. However, the author says that mouthrot is seldom contagious. It may not be with iguanas (although I would expect it to be), but it certainly seems to be with snakes.

Despite the inaccuracies, this book, unlike so many others, gives the feeling that the author is sincere in wanting to help people care for their iguanas.

The 13 half-tone photographs in the text are mainly incidental, neither adding nor detracting. However, the one color photograph--on the cover--is a very poor choice, as the iguana has a raw, swollen, and possibly infected nose.

Breeding, for the purposes of the pet keeper, is not mentioned.

The bibliography is fairly good except that three of the seven books listed deal only with North American species, including the most technical book (*Handbook of Lizards*, Smith).

Pet Chameleons is a surprisingly accurate book.

Caging is covered well. The one point here is that the author keeps some rolled-up socks in her chameleons' cage, and she says that on cool nights the lizards crawl in "to keep warm". As they produce no heat of their own, this is impossible.

Feeding is covered very well. Their need for water droplets is emphasized, and there is a warning about mealworm chiton and its effects.

Temperature is a bit of a problem. The given temperature range is 70°F-75°F, but 75°F-80°F is more within their preferred range.

The only ailment covered is bot-fly parasitism, which is covered adequately. There seem to be few health problems with *Anolis c. carolinensis*.

Throughout the book, the author evidences a real care for her animals, which is rare among pet-book authors.

The photographs (17 half-tone) are few and pertinent.

For hatching eggs, the continuing need for moisture should be stated as the danger of too much moisture is.

There is no bibliography.

Horned Toads As Pets is a poor book. It is, unfortunately, an example of the worst in pet books.

Caging seems to be the best covered subject. However, the book recommends that if one catches his own lizard, he should also take sand, rocks, etc. from the same area for the cage. Not surprisingly, the book fails to mention parasites.

"Feeding is not much of a problem for this pet", says the book. He "readily takes most small insects." There is no particular emphasis on ants, which are the dietary staple of *Phrynosoma*. There is also no warning about mealworm chiton. The book also states that water can be given on a leaf in droplets or in a bowl. Few, if any, specimens can drink from a bowl.

The discussion of temperature, while set at an acceptable level (80°F) for some species (but too low for others, notably *P. m'calli*), is composed of two sentences.

No particular species is named, hence no particular requirements are given.

Ailments are not mentioned.

Three statements, other than those mentioned, stand out in any consideration of responsibility and accuracy. The first is minor; "This creature is viviparous". *P. douglassi* is; *P. cornutum*, shown in the pictures, as most other *Phrynosoma* species, is oviparous. The second statement is more serious. The book says that if the lizard is not evident for a few days, "don't worry about him--he is hibernating". Why, if the temperature is 80°F? He has more likely escaped, if he was lucky, or died, if he was not. The third is the most serious: "This pet is one of the easiest to care for and maintain." This is the fiction which has helped to keep alive the demand for a lizard which is almost entirely unfit for captivity, except in the most exacting micro-environments.

The 19 half-tone photographs show a *P. cornutum* that is wary and appears frightened.

Breeding is not mentioned, as the author considers the entire genus to be viviparous.

There is no bibliography.

Geckos As Pets is an outstanding book. Due to the small number of negative points, the usual format will not be used.

First, the author only specifically discusses those species normally available through various facets of the animal trade.

Second, specific requirements are given only for those species discussed.

Third, the picture on the bottom of page 6 is the same picture as is on the top of page 37 but inverted.

Last, there is no bibliography.

Chameleons As Pets is marginally adequate. There is a fair amount of information about the animals, but much of it is not pertinent, and it is given space in the same manner as a newspaper space filler.

Caging is covered adequately. One problem here is the fairly general recommendation of glass or plastic film for a cage cover. Both will tend to make the cage too humid and restrict air movement.

Feeding is related well, although with no special points, good or bad.

Temperature is given extended explanation in connection with maintaining it. However, 75°F is given as the proper temperature; this is within the animal's preferred range. However, 80°F is closer to the center of the range and would probably satisfy more individuals.

Botflies are the only parasite mentioned. Coverage is short but adequate.

The book has most of the requisite information, but the author devotes a large amount of space to items of the "Look at him. Isn't he cute?" type and little or none to explanations of value to the uneducated, such as why heat is necessary. The author also says (in other books besides this one) that chordates have spines--a minor point, but still one that should be corrected.

The 19 half-tone photographs in many cases help to illustrate the text, but at least two (pages 9, 15) were done in an apparent effort to be cute and do not belong.

Judging from the paragraph on hatching eggs, the author has no particular hope that any eggs laid will be fertile. No temperature is given, and the main mention of moisture is a warning against too much of it.

There is no bibliography.

Enjoy Your Chameleon is a poor book.

Caging is covered adequately, although the gallon jar recommended will hamper the animal's exercise somewhat, especially if more than one lizard is kept in it.

Feeding is not covered particularly well. In addition to lacking a generalized list of acceptable foods, a warning is given about possible internal "difficulties" caused by the hard shell of mealworm beetles. There is, however, no word about the larva's chiton.

Temperature is covered poorly. The author says to place the cage in a sunny location--but does not mention shade. In another section, 60°F is implied to be the proper temperature--but the anole's preferred optimum is 72.3°F-86.9°F.

The ailments covered are cold exposure and botflies, but the latter is lightly passed over as unlikely.

The author has, unforunately, tried to write a book dealing more with enjoying the animal as a plaything than caring for it as a living organism. The amount of reference to tricks and the "isn't that a sight!" tone of the book seem to indicate this.

The 22 color photographs tend to interfere with the text, and very few show any facets of keeping the animals in a proper environment. The most serious fault, however, is the cover photograph of *Chameleo chameleon*. The center picture of *C. jacksoni* is interesting (although unidentified), but the cover picture gives a misleading idea of the book's content.

Breeding is covered quickly, but with a workable method.

There is no bibliography.

CHAPTER 6 - CROCODILIANS

1. Carl Kauffeld. *Pet Alligators*. Fond du Lac, Wisc. All-Pets Books, Inc. 1962. 24 pp.
2. Mervin F. Roberts. *Alligators*. Jersey City, N.J. TFH Publications, Inc. 1958. 22 pp.
3. Earl Schneider, Ed. *Enjoy Your Alligator*. New York. Pet Library Ltd. 1967. 32 pp.

All are sold in the pet trade.

Pet Alligators is a good book, although it could have been made more effective.

Caging is covered fairly well. The author does say that large cages are unnecessary and a cage need be only slightly longer than the animal. However, exercise is still needed, so that the animal will have to be allowed out of his cage more often. The author also suggest using a false floor of wire screening over the bottom of the water to keep droppings from freely mixing with the water. It is difficult to understand how a wire mesh could prevent this.

Feeding is basically covered well, although the nutritional benefits of whole animals could have been expressed more strongly. Since the average crocodilian hatchling can easily eat food and size of a new-born gerbil, deficiency problems could be more easily prevented.

Temperature is done marginally well. The preference of radiant heat is pointed out, and the proper temperature range (80°F-90°F) is given. However, the author states that the principles in the book are applicable to any crocodilian, and it would be preferable to point out that at least for tropical and subtropical, it is advisable or even necessary to heat the water in addition to providing radiant heat.

The requirements that the author gives are more appropriate for *Alligator mississippiensis* (or *A. sinensis*, were it available) than for other crocodilians. The main faults, though, are temperature (see above) and a lack of mention of salt- or brackish-water for forms normally living in it.

The author declines to cover any ailments other than malnutrition on the grounds that: 1. malnutrition (and attendant mistreatment) are the basis of most diseases encountered (lowered resistance), and 2. that a commercially acquired baby animal would have little or no opportunity to pick up parasites, e.g., linguatulids. While the reasons are basically valid, some source of information, even an offer of help from the author, should be indicated. A stubborn respiratory infection, an animal caught by the fancier in the wild, or a person who has had very bad luck in the choice of individual animals have no recourse.

The author has written an understandable, basically quite accurate book concerned with what a crocodilian is and how to take care of it. Other than water temperature and salt, I find no cause for disagreement.

The 12 half-tone drawings illustrate points of the text, and serve as a help rather than a hinderance.

Instructions on hatching eggs are omitted as being useless at this level.

The bibliography consists of two books; more sources, particularly on the captive care of such animals, would be preferable.

Alligators is an inadequate book. Although it does not doom the animal, it could be more helpful. Caging, from the standpoint of the animal's welfare, is handled adequately. However, the recommendations are against considering attractiveness. Since the aesthetic value of the cage can be increased without increasing the effort and time needed for cleaning, and since the prettier the cage, the more likely it is to be on display (and therefore kept up), it is foolish to recommend otherwise.

Feeding is not done well. Besides neglecting nutritional needs, full thawing of frozen foods, and the advantage to feeding whole organisms, the author says that the food can be in any condition from fresh to "practically rotten." While crocodilians undoubtedly do eat carrion, this is by choice, and it is irresponsible to force a pet to do so. It also is begging for digestive troubles. The author also states that a young crocodilian cannot be overfed--some animals, regardless of size or species, cannot be overfed; others not only can be but cooperate whole-heartedly.

This is one of the few books which give too high a temperature, rather than too low. There is no specified air temperature, but water temperatures are given as 90°F during the day and 80°F at night. If a properly heated basking site is furnished during the day, 80°F (water temp.) will be very adequate at any hour.

The only disease specifically mentioned is skin fungus. While the treatment is adequate, malnutrition should also be explained and not passed over.

Out of a total of 26 pages, 7 deal with care, and 4 of those have part of their space given over to pictures, so that a fraction over 4 pages of text pertains directly to care. While the section of choosing an animal should not be denied space, the items of general interest about crocodilians, particularly in such a large proportion, should not take up space in a book purporting to instruct people in their captive care.

Of the 18 half-tone photographs, only 3 illustrate facets of care; the rest seem to be included as space fillers. In addition, an animal is identified twice as a caiman; it is a crocodile, probably *C. acutus*. Yet the author devotes a paragraph to the "4th tooth" difference (the pictured animal's tooth is clearly visible outside its closed jaws.)

Breeding is skipped as not being applicable.

There is no bibliography.

Enjoy Your Alligator is a poor book, almost completely lacking in basic information on care in captivity.

Caging would have been properly dealt with, had a cage size been specified. However, there is no such specification--relative to the animal or otherwise. The book does not even imply that the animal should be able to move his nose away from his tail.

Feeding is poorly covered. There is no mention of the nutritional advantages of whole animals, or in fact of nutritional values, per se, at all.

Temperature is also covered poorly. The range suggested is 75°F-85°F. While adequate, a more exact figure can be specified with an aquarium heater as the heat source, and 75°F is too low for a tropical animal. In a more serious fault, no light or heat source for the basking surface is specified or even advised.

Ailments are not discussed.

The responsibility of any book supposedly dealing with the care of an animal in this book's fashion is questionable. Of 31 pages, approximately 15 page-equivalents are taken up by pictures and captions and only 2-1/3 pages actually deal with care of the animal. Also, the reference is always to "alligator" rather than "caiman". While caimans are often sold as alligators, the idea should be to correct rather than perpetuate the impression.

When the space used to offset section headings is considered, the 22 color photographs quite overpower the text.

Captive breeding is not considered.

There is no bibliography.

APPENDIX

	Caging	Feeding	Temperature	Requirements	Diversity	Health	Responsibility	Photography	Breeding	Bibliography	Averages
Allen, Neill	5	5	4	4	4	3	4	5	4	5	4.3
Breen--*In Your Home*	4	3	3	2	1	3	1	1	2	1	2.1
Breen--*Habits and Care*	4	3	3	2	1	3	2	4	2	1	2.5
Harman	4	3	3	3	2	2	4	5	4	1	3.1
Hoopes	4	4	3	3	2	3	4	4	2	3	3.2
Roberts--*Begin Terr.*	4	1	3	1	2	1	2	4	1	2	2.1
Roberts--*Your Terr.*	3	4	2	1	3	2	3	3	1	3	2.5
Villiard	4	4	3	4	4	4	4	4	3	1	3.5
Vogel	4	5	4	4	5-	4	2	5	2	3	3.8-
Turtle Facts	3	2	3	1	1	2	1	1	1	1	1.6
Burt, Landry	3	2	3	1	1	2	1	2	2	1	1.8
Church	4	4	4	4	4	3	4	4	1	3	3.5
Dowling, Spencook	3+	4+	4	1	4	4+	5	5	4	4+	3.8+
Haas	4	4	3	3	4	3	4	3	1	1	3.0
Knight	4	3	2	1	2	1	2	2	3	1	2.1
Mehrtens	5-	5-	4	5-	5-	5-	5	4	5	5	4.8-
Noel-Hume	4	3	2	3	4	2	4	3	4	1	3.0
Pritchard	5	4	4	4	5	5-	5	5	2	5	4.4
Roberts--*Turtles*	3	3	3	2	2	3	3	3	1	1	2.4
Smith--*Pet Turtles*	4	3	4	3	4+	2	4	4	3	1	3.2
Smith--*In Color*	4	3	4	3	4+	2	4	3	3	1	3.1
Tinkle	2	2	2	1+	4	2-	1	3	2-	1	2.0-
Kauffeld--*Snakes*	5-	5	5-	4	4+	5	5	4	3	4+	4.4
Nowinsky	3	2+	1+	1	2	2	1+	3	1	1+	1.7+
Roberts--*Snakes*	2	2	1	1	2	1	2	2	2	3	1.8
Smith--*Snakes*	5-	5-	4+	4	4	5-	5	4	3	5+	4.4-
Burghardt	3	4-	3	3	4	3-	2	3	1	3	2.9
Greenberg	4	5	2	1	1	4	5	5	2	1	3.0
Ragland, Van Der Meid	4-	3	2	1	1	1	1	1	1	1	1.6-
Pawley	5	5	5	5-	5-	5	5	5	5	1	4.6-
Roberts--*Chameleons*	4-	4	3	1	1	4	2	2	3	1	2.5-
Schneider--*Chameleons*	4-	3	1	1	1	3	1	1	4	1	2.0-
Kauffeld--*Alligators*	4	4	4	3	4	4-	5-	5	1	2	3.6
Roberts--*Alligators*	4	2	2	1	1	2	2	2	1	1	1.8
Schneider--*Alligators*	2	2	2	1	1	1	1	1	1	1	1.3

All ratings are subjective. Omitted categories are rated "1".

The average is included only as a general comparison.

1300 - 30th Street, B-1, No. 18., Boulder, Colorado 80303

A Blue *Thamnophis sirtalis sirtalis* from Maryland

Several abnormally pigmented eastern garter snakes, *Thamnophis sirtalis sirtalis*, have previously been reported from Maryland (Groves, 1966; Franz, 1968; Harris, 1970). Of these anomalies, none has involved blue specimens.

On 24 July 1972 one of us (Boyer) collected an abnormally pigmented eastern garter snake at a pond along Winespring Lane, Baltimore County, Maryland. The snake was found feeding on recently transformed green frogs, *Rana clamitans melanota*, at the edge of the pond.

The ground color is steel gray or light blue respectively depending on whether the specimen is viewed under artificial or natural light. The top of the head is light blue. The color of the eyes and tongue are normal. The labials and chin are white, as are the first 14 ventrals. Two rows of black spots are present on each side of the body, but the lateral stripes are absent. A faint middorsal stripe is present anteriorly, becoming indistinct over the posterior half of the body. A few greenish-yellow interspaces are widely scattered over the lateral surfaces. Beginning at the fifteenth ventral, an orange-red stripe runs down the center of the belly. This stripe fades when it reaches the caudal region, and toward the lateral edges of the ventrals. A single yellow parietal spot is present. The specimen, a male, measures 360 mm total length. The scalation is normal.

According to Bellairs (1969), reptiles seem to lack actual blue pigments; the presence of this color is usually due to iridophores. These chromatophores lie in the superficial layer of dermal cells and contain a more or less colorless, semi-crystalline material known as guanine, a substance allied to uric acid. Guanine is a good reflector and has a strong modifying effect on light. Alone, iridophores produce white, but when combined with melanophores, the light of certain wave-lengths are scattered, producing blue.

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Bellairs, Angus.
1969. The life of reptiles, Vol. 2. Weidenfeld and Nicolson, London, 283-590.

Franz, Richard.
1968. Abnormal coloration in *Thamnophis sirtalis sirtalis* from the Allegheny Plateau of Maryland. Bull. Md. Herp. Soc., 4(4): 80.

Groves, John D.
1966. Notes on a xanthic eastern garter snake, *Thamnophis s. sirtalis*. Bull. Md. Herp. Soc., 2(3): 8.

Harris, Herbert S., Jr.
1970. Abnormal pigmentation in Maryland amphibians and reptiles. Bull. Md. Herp. Soc., 6(2): 21-27.

—John D. Groves and Donld Boyer, *Reptile Department, Baltimore Zoo, Baltimore Maryland 21217; and 6900 Charles Ridge Road, Baltimore, Maryland 21204.*

Received 23 August 1972

MARYLAND HERPETOLOGY

Publish your field notes concerning Maryland amphibians and reptiles in this brand new addition to the BULLETIN of the Maryland Herpetological Society. We can utilize all manner of notes, particularly, those dealing with reproduction and life history, feeding, predation, unusual locality records, unusual behavior (and also the usual), etc. Brief accounts containing 75 words or less including the common name, locality (county, specific location), date, observation (eliminate unneccessary words, use phrases where possible), author's name (no address) should be sent to RICHARD FRANZ, DIVISION OF NATURAL SCIENCES, FLORIDA STATE MUSEUM, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA, 32601. We especially welcome notes from younger members.

72-0001. *American toad*, Baltimore Co., Padonia Rd., night 13 April 1972, large chorus, numerous pairs in amplexus, 7 breeding males SV length from 52-75 mm. (av. 64.6), 7 females 64-80 mm. (av. 71.9).

Robert Quinn

72-0002. *Upland chorus frog*, Baltimore Co., Owings Mills off Bonita Ave., 2 March 1972, flooded field, large chorus, males calling from water, numerous pairs in amplexus, one female deposited 400 eggs (360 fertile), hatched 15 March (room temperature).

Richard Franz

72-0003. *frogs*, Anne Arundel Co., pond approx. 1 mi. N of entrance to Gibson Is. off Mountain Rd., 13 July 1972, male green treefrogs (15-20) calling from willows and black berry bushes around margin (4-6 feet above water), gray treefrogs (10-12) from trees in marshy NW end, cricketfrogs, greenfrogs, bullfrogs calling from water, 2 green treefrogs collected, both without stripe.

Dave Kramer

72-0004. *Smooth green snake*, Garrett Co., Cranesville Swamp, female (SV 322 mm.,TL 366) deposited 6 elongate eggs (largest 33.0 X 10.5 mm.) on 27 July 1971, one egg dissected after deposition revealed 61 mm. (SV 46) long embryo having well developed head, eyes, no skin pigment, heart beat, much yolk.

David Lee

72-0005. *Northern copperhead*, Carroll Co., 2 mi. N of Rt. 26 near Strawbridge Estates off Rt. 32, 6 July 1972, female (SV 559 mm., TL 638, WT 198.1 g.) containing 10 large eggs (6 on right side), WT of reproductive structures including eggs 54.6 g.

Frank Groves

72-0006. *Timber rattlesnake*, Garrett Co., Maple Glade Rd., Swallow Falls S.P., 2 July 1972, 2 females DOR approx. 4PM, one (SV 810 mm., TL 890, WT 409.5 g.) contained 2 woodland jumping mice (Wt. of one, 23.4 g.) and 2 deer mice (Wt. of one, 15.2 g.), other snake (SV 765 mm., TL 820, WT 270.4 g.) contained no food items, both nongravid.

Richard Franz

NEWS & NOTES

EASTERN SEABOARD HERPETOLOGICAL LEAGUE MEETING, SUNDAY, 29 OCTOBER 1972, COLUMBIA UNION COLLEGE, TAKOMA PARK, MARYLAND: JOINTLY SPONSORED BY THE MARYLAND HERPETOLOGICAL SOCIETY, THE NORTHERN VIRGINIA HERPETOLOGICAL ASSOCIATION, AND THE VIRGINIA HERPETOLOGICAL SOCIETY: OPEN TO ALL AMATEUR AND PROFESSIONAL HERPETOLOGISTS, THEIR FAMILIES, FRIENDS, AND GUESTS.

Program (subject to change and modification)

12:30-1:15 P.M. -Registration, setting up of exhibits, final speaker line-up: entrance of Columbia Union College SCIENCE BUILDING (Number 6 on map)

/Lunch will be available at the CUC Snack Shop in CAMPUS CENTER BUILDING (Number 1 on map); food is all vegetarian. There will be plenty of visitor parking made available for us./

1:30-3:15 P.M. -First Session: the amphitheater in SCIENCE BUILDING
Introductory remarks by Dr. Lester E. Harris, Jr., Head Department of Biology, Columbia Union College.

Keynote address by Dr. R. Bruce Bury, Chief, Herpetology Section, Bird & Mammal Laboratories, Bureau of Sport Fisheries, United States Department of the Interior: "Recent Conservation Legislation and Its Impact on Herpetologists"

Special Guest address by Mr. Jaren G. Horsley, Curator, Division of Amphibians and Reptiles, National Zoological Park: "The New Zoo and Its Changing Role".

3:15-4:00 P.M. -Break for examination of exhibits, socializing, etc.

4:15-5:45 P.M. -Second Session: the amphitheater in SCIENCE BUILDING
Brief remarks from representatives of each participating regional herp group.
Various presentations by speakers from regional groups(limit: 10 minutes each).

/4:30-5:30 P.M. - Meeting of ESHL organizational representative and representatives of regional groups wishing to join ESHL in Library of SCIENCE BUILDING to conduct business/

6:00 P.M. -Adjourn for dinner in Cafeteria (all vegetarian) of CAMPUS CENTER BUILDING

Flat rate of $1.50 per person, no limit on servings; however, we MUST be on time!

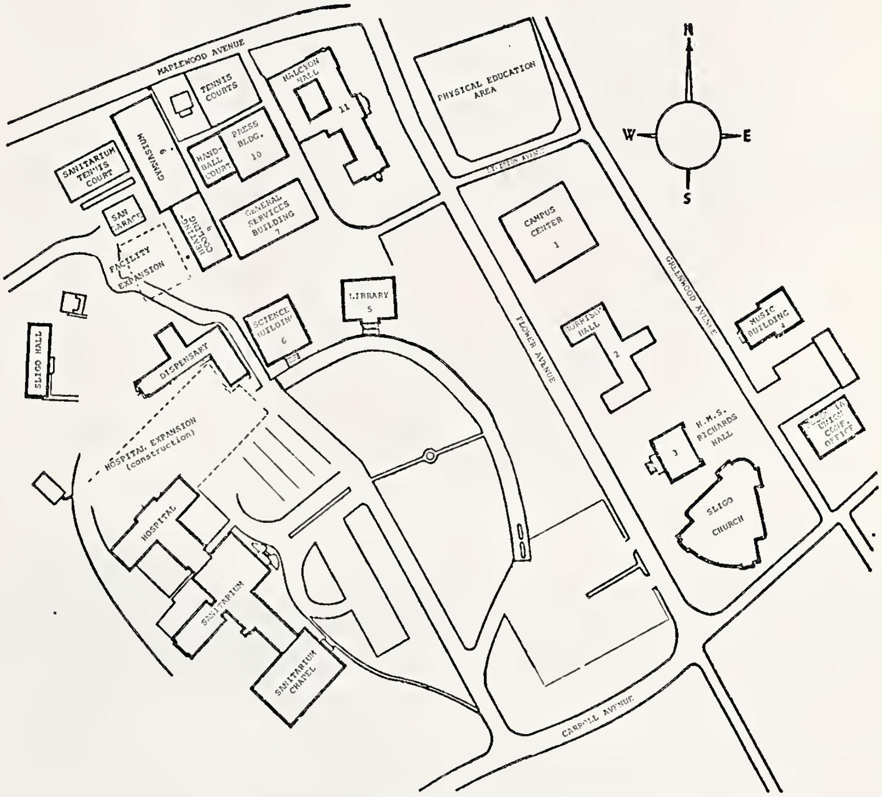
PLEASE NOTE: The CUC Biology Department will provide caging for herps brought for exhibition. Please DO NOT bring poisonous snakes or lizards. All exhibit material should be clearly labeled and identified; include your name and address, as well as herp group affiliation(s). CUC will provide 16mm and slide ("Carrousel") projectors; you may wish to bring your own reels or trays (make sure they fit the projectors!). Please refrain from smoking in classroom; smoking areas will be set aside for our use.

DIRECTIONS TO COLUMBIA UNION COLLEGE: Please refer to a Washington, DC, area road map, which may be obtained from any service station near the City. Take Exit 25 South (New Hampshire Avenue, which is Maryland State Route 650) from the Capital Beltway (Interstate 495) to East-West Highway (Maryland State Route 410) at Takoma. Park. Turn right onto East-West Highway and proceed across County line into Montgomery County. Shortly thereafter, Carroll Avenue intersects East-West Highway obliquely at a traffic signal. Turn right onto Carroll Avenue and continue to

Flower Avenue, which is just past the Washington Sanitarium; intersection is marked by large, domed church. Turn left to visitors' parking across street from CAMPUS CENTER BUILDING.

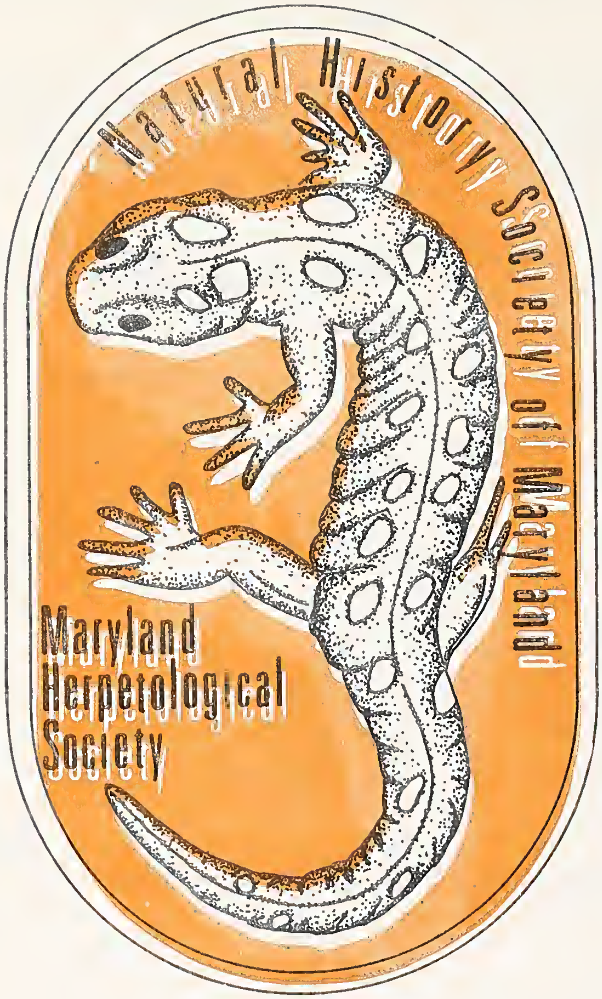
For further information, you may contact me (telephone 301-927-7171) or Margaret M. Thomas, Secretary, ESHL, 1611 - 31st Street, N.W., #104, Washington, DC 20007 (telephone 202-338-7389).

—Robert G. Tuck, Jr., President, MdHS, and Coordinator, ESHL; 5431 - 56th Avenue, #3, Riverdale, MD 20840.



COLUMBIA UNION COLLEGE

MAP COURTESY OF DR. LESTER E. HARRIS


Natural History Society of Maryland
Maryland Herpetological Society

Cloth patches of the Maryland Herpetological Society (as illustrated above) are still available to members or non-members at the cost of $2.00 each or 3 for $5.00. They are in limited supply so order promptly. These patches are of the finest quality and look very good on field jackets ... order yours now!

Send check or money order, made payable to the Maryland Herpetological Society, to MHS, Dept. Herpetology, Nat. Hist. Soc., Md., 2643 N. Charles St., Baltimore, Maryland 21218.

Editor's Note:

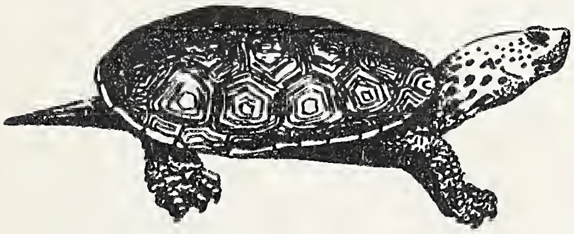
The revision and republication of the Distribution Survey of Maryland and the District of Columbia is scheduled for the December 1973 issue of the Bulletin of the Maryland Herpetological Society as initially planned. Since its publication in December 1969, three new amphibians and reptiles have been recorded for the state. Numerous range extensions, new county records, etc. have also been reported. All copies of the survey have been exhausted for some time now, and new requests continue to pour in.

Please check your data, and if you have any new material concerning the distribution of Maryland's amphibians or reptiles send it to:

Herbert S. Harris, Jr.
Curator, Dept. Herpetology
Nat. Hist. Soc. Md., Inc.
2643 N. Charles Street
Baltimore, Maryland 21218.

I will acknowledge all data received in the forth coming survey. With your help, we will try and make this revision of the Distributional Survey as complete as possible. Thank you.

HSH



THE REPTILES OF MARYLAND
AND THE
DISTRICT OF COLUMBIA

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A carefully detailed coverage of the distribution (known in 1945) and life histories of Maryland snakes, lizards and turtles. Contains 194 pages, 46 distribution maps, black and white photographs of 48 forms, and a comprehensive bibliography to 1945. $1.85 postpaid. Order from: Natural History Society of Maryland, 2643 N. Charles Street, Baltimore, Maryland 21218.

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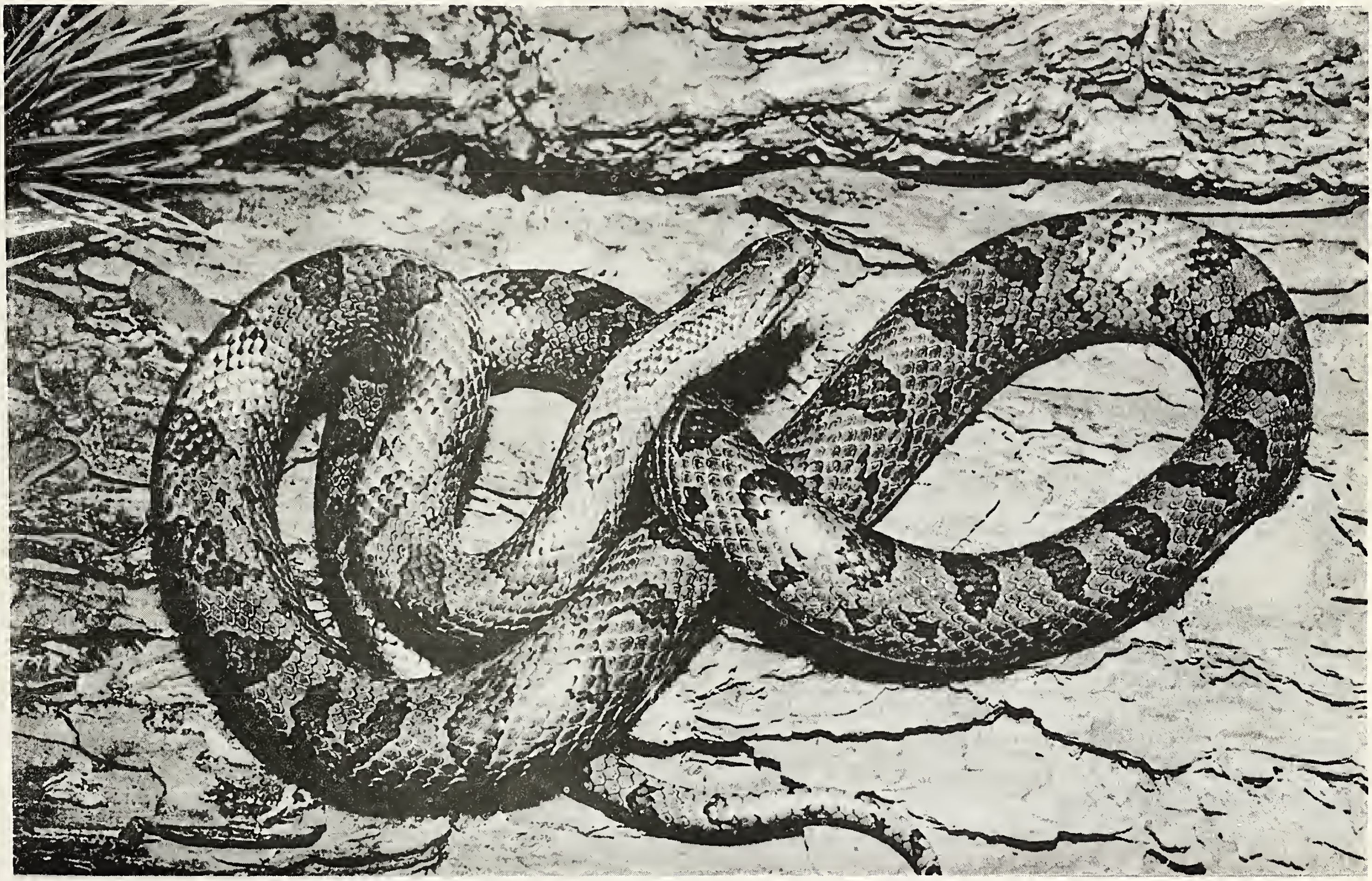
R G TUCK, JR
DEC 26 1972

BULLETIN OF THE

Maryland Herpetological Society

The Natural History Society of Maryland, Inc.



DECEMBER 1972 VOLUME 8, NUMBER 4

Bulletin of the Maryland Herpetological Society
Volume 8 Number 4 December 1972

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The Cover: An adult Mole Snake, *Lampropeltis calligaster rhombomaculata*, from Fort Meade, Anne Arundel Co., Maryland. Photography by Dr. R. S. Simmons.

Ed. Note: Manscripts being submitted for publication should be typewritten (double spaced) on good quality 8-1/2 by 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at the end in alphabetical order by autnor. Reprints are available at $.01 a page ($.02 a page with photographs) and should be ordered when manuscripts are sent in. Minimum order 100 reprints.

MdHS........a founder member of the Eastern Seaboard Herpetological League

The Maryland Herpetological Society, Department of Herpetology, Natural History Society of Maryland, Inc., 2643 North Charles Street, Baltimore, Maryland 21218.

IN MEMORIAM

JOSEPH ALBERT SCHUCH, JR.
SHARON ANN HAMER SCHUCH

1950 - 1972
1952 - 1972

Joseph Schuch, Jr. and his wife Sharon, died in the crash of their light plane, along with the pilot Roy Von Nordeck, during a severe thunder storm on the night of June 18th, 1972. Joseph had been a member of the Maryland Herpetological Society since it's founding. He has served, both as an Associate Editor of the BULLETIN, and on the Steering Committee of the Society. He has led many of the organized field trips sponsored by the Society. Beyond this, he was one of the most active members of the Organization, and a fine friend to all of those who knew him. Their tragic deaths are, indeed, a great loss to the Society.

BULLETIN OF THE
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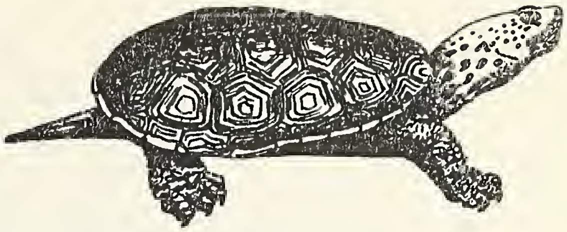

Volume 8 Number 4 December 1972

The Maryland Herpetological Society
Department of Herpetology, Natural History Society of Maryland, Inc.

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Meetings

The third saturday of each month, 9:45 a.m. at the Natural History Society of Maryland (Except May-Aug., 8:00 a.m.).

A Note On Climbing in the Stinkpot, *Sternotherus odoratus*

The stinkpot, *Sternotherus odoratus*, is generally considered to be a strickly aquatic turtle, seldom if ever leaving the water to bask (Babcock, 1919; Carr, 1952 and others), however, McCauley (1945), Conant (1958) and Pritchard (1967) mentioned that it occasionally climbs bushes and trees to bask. Although the tree climbing ability of this turtle has been mentioned in the literature no specific instances have been reported.

On 24 July 1972, Mr. and Mrs. Donald Kolbe collected an adult male (102 mm) *Sternotherus odoratus* in a black willow tree, *Salix nigra* along Sherman Creek, near New Germantown, Perry County, Pennsylvania. The turtle was found stretched out along the tree trunk, facing the outer branches of the tree, 14 feet above the waters surface. The tree extends out over the water at a 45° angle, and has a trunk diameter of 12 inches. Conant (1958) implies that when disturbed basking turtles will drop off the tree into the water, however, this specimen climbed higher into the tree when disturbed.

The ease in which this turtle was able to manuever in the tree supports Conant's (1958) statement that because of the small plastron and the consequent greater mobility of legs, the stinkpot is able to climb trees effectively, enabling it to take advantage of hortizontal basking places.

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——John D. Groves, Reptile Department, Baltimore Zoo, Baltimore, Maryland 21217

Received 13 September 1971

Notes on Cave-Dewelling *Rana palustris* in Mississippi

Black (1971) list *Rana palustris* as the only frog that is consistently found near the twilight zone in the caves of Arkansas, Missouri, and Oklahoma. Black places *Rana palustris* in the trogloxene classification. In most instances it is assumed that ranid frogs are accidentally found in caves.

On 24 June 1972, I collected three *Rana palustris* in Pitts cave, 5 miles N of Waynesboro, Wayne County, Mississippi, about 20 yards from the cave's entrance. The only other amphibians observed in this cave were *Plethodon glutinosus, Eurycea bislineata*, and *Eurycea longicauda.*

Several days after capture, one frog (ELK 1107, 64 mm S-V length) was examined. The stomach contained one *Plethodon glutinosus* 32 mm in S-V length and 45 mm in total length. It is of interest to note the feeding behavior of this frog.

Rana palustris has been observed by me, in the caves of Jasper, Wayne, and Tishomingo counties, Mississippi. This frog's occurrence in additional caves of Mississippi should be expected.

Specimens of the species mentioned have been deposited in the museum of University of Southern Mississippi. I would like to thank Jerry Hass for his assisstance in the field.

Literature Cited

Black, Jeffrey H.
1971. The Cave Life of Oklahoma A Preliminary Study (excluding Chiroptera): Oklahoma Underground 4: 31-32.

—E. Leslie Knight, *Department of Science Education, University of Southern Mississippi, Hattiesburg, Mississippi.*

Received 8 August 1972

Feeding in Florida cricket frogs

Between 21-26 September 1970, Florida cricket frogs, *Acris gryllus dorsalis*, were collected at various times of the day/night along a grassy shoreline at Camp Bell Ridge, Red Water Lake, 4 mi. E of Hawthorne, Putnam County, Florida. They were immediately preserved in formalin to stop digestion. The collection site consisted of a narrow sandy beach and a lawn kept short by grazing cattle. Before the camp was constructed, the beach area housed a stand of bald cypress. Behind the lawn and the lake, there is a dry sandy pine-live oak parkland.

Ants (Formicidae) were found in 70 percent of the stomachs and represented 68.3 percent of the ingested items. Mosquitoes (Culicidae), representing 11.5 percent of the food, replaced ants in the early morning collections (Table 1.). Frogs collected between 10 PM and 7 AM contained no food in their stomachs but had some digested material in the lower portions of their intestine and rectum. Leaf bugs (Miridae) were the third most abundant food item (8.7 percent); spiders were fourth (6 percent). The largest number of food items ingested by one specimen was 13 (12 ants, 1 mirid); the largest items were mirids and elaterids, 7 mm. long.

Food Items	No. of Items	Percent	No. of Stomachs	Percent
Insecta	171	94.0	40	100.0
Hymenoptera				
Formicidae	124	68.3	28	70.0
Diptera				
Culicidae	21	11.5	10	25.0
Chironomidae	2	1.0	1	2.5
Hemiptera				
Miridae	16	8.7	14	35.0
Coleoptera				
Chrysomelidae	1	0.5	1	2.5
Elateridae	6	3.5	2	5.0
Scarabaeidae	1	0.5	1	2.5
Arachnida	11	6.0	10	25.0
Araneae	11	6.0	10	25.0

Table 1. Food ingested by 40 Florida cricket frogs *Acris gryllus dorsalis* from Redwater Lake, Putnam County, Florida.

Using a sweep net, a sample of the insect fauna inhabiting the grassy shoreline was obtained. Tiny nymphal grasshoppers (Acrididae and Tettigoniidae) and leaf hoppers (Cicadellidae) were by far the most obvious invertebrates, yet none were found in the gastro-intestinal tracts of these frogs. The orthopterans and homopterans were most abundant near the ends of leaf blades and on the inflorescences; the leaf bugs usually at the base of the plants; and the ants, particularly on the ground but also on the plants. Foraging frogs were usually observed on the ground between the plants where the ants and leaf bugs were more common. Perhaps due to their positions on the ends of leaves and flower stalks, their ability to take flight easily, or their protective coloration, the orthopterans and homopterans were unavailable to the foraging cricket frogs.

—Richard Franz, *Division of Natural Sciences, Florida State Museum, Gainesville, Florida, 32601.*

Received 13 July 1972

List of the Amphibians and Reptiles of Assateague Island

David S. Lee

Assateague Island is a barrier beach, thirty miles in length, lying off the coasts of Maryland and Virginia. It is part of a continuous chain of such beaches extending from the southern boundary of Delaware to Cape Charles, Virginia (at the mouth of the Chesapeake Bay), and has withstood the onslaughts of the sea since its conception during glacial and preglacial times. Prior to a storm in August of 1933, Assateague Island was an extension of a narrow projection of beach dunes that reached south from Delaware. Shortly afterwards the Army Corps of Engineers stabilized an inlet that now separates the northern end of Assateague from the southern end of Fenwick Island (Ocean City). The island is separated from the mainland by several miles of salt marshes and bays.

Assateague Island has been divided into three major habitats (Paradiso and Handley, 1965). In Fig. 1, I have attempted to illustrate these areas:

A. Dunes - sparsely vegetated mounds of sand and nearest the ocean beach. Plants such as beach grass, seaside goldenrod, sea rocket dominate.

B. Marshes - vast areas of cord grass (*Spartina sp.*), which covers tidal areas on the bay side of the island, and artificial impoundments built to hold rain water in an effort to provide more habitat for migratory waterfowl.

C. Forest - these areas are prevalent on higher, drier parts of the island. In many places the forest is dwarfed by salt spray and becomes a dense shrub thicket. The south (Virginia) end of Assateague Island is the widest (about four miles), and here the trees reach their greatest size. Loblolly pine dominates

The southern end of Assateague Island is designated as the Chincoteague National Wildlife Refuge, not to be confused with the neighboring town and island of the same name. Most of the land is federally owned, but a small portion belongs to the state of Maryland near the north end and is a state park.

The following list is based on numerous field trips to this island over the last four years. I feel certain that other species of amphibians and reptiles will be found on the island, but it seems desirable to publish these records at this time This will hopefully inspire reports of additional records.

List of Species

Bufo woodhousei This is one of the most common species on the island. They are present in all three zones but appear most commonly in the secondary dunes and shrub thickets. In May, 1971, I found a large breeding concentration in a slightly brackish pool on the north end of the island.

Hyla cinerea This frog is common throughout the island wherever it can find adequate moisture. Males can be heard calling through the summer. I strongly suspect that the eggs and larvae of this *Hyla* can withstand mildly brackish water, perhaps a significant part of its success here.

Rana pipiens In early spring I have heard small choruses of leopard frogs calling from natural, water-filled depressions on the south end of the island. On 7 October 1972, I found three adults in a water-filled metal tank behind the primary dunes on the north end of the island. These frogs were at least a half mile from the nearest permanent fresh water.

Sceloporus undulatus Two adult female fence lizards were observed on the south end of the island on 18 August 1972. They were in a relatively open stand of loblolly pine. In spite of careful searching, no additional lizards have been seen, although this species is common in the Cape Henlopen State Park (Delaware), an ecologically similar area that was continuous with Assateague prior to 1933.

Heterodon platyrhinos The hognose snake is most common in the inner dune area, and its tracks are frequently seen on the primary dunes and even the beach itself. In May, 1971, Arnold Norden and I found one individual in the edge of the surf. Park rangers say that they have also encountered them occasionally at the sea's edge.

Opheodrys aestivus Jean Worthley and John McNealey found a single rough green snake on the Maryland end of the island (North Beach area-bayside) in the fall of 1972. To the best of my knowledge no other specimens are known from the island.

Coluber constrictor Black racers are not uncommon throughout the wooded portions of the island.

Elaphe obsoleta Dick Franz and I found one juvenile specimen on the road on the southern end of the island (Nov. 1971).

Pituophis melanoleucus (?) Irving Hampe told me of a sketch he made of a large, blotched snake that he saw swimming in Sinepuxent Bay. He later identified the snake from his sketch and concluded that it was a pine snake. He told me at that time (spring, 1969) that the ranger had informed him that "bull snakes" frequently swam out to the island during the bird nesting season (terns and skimmers, in May) to eat eggs. The Ocean City area is overdeveloped, but prior to the chain saw, this area of Maryland offered some promising habitat for this illusive species. I am not attempting to document the presence of *Pituophis* in Maryland, but I think Hampe's report is worthy of mention.

Natrix sipedon Occurs in brackish and salt marshes. Uncommon. All individuals observed have been small.

Thamnophis sirtalis Dick Franz reports a single DOR specimen from the south end of the island. Date not recorded.

Kinosternon subrubrum I have seen three specimens; one in a brackish pool on the Maryland end, and two individuals crossing the road bordering the fresh water impoundments on the Chincoteague end.

Chelydra serpentina Snapping turtles are apparently common in the fresh water impoundments on the southern end of the island. The refuge has been trapping and removing them because of their possible detrimental effect on nesting wildfowl.

Clemmys guttata Arnold Norden reports seeing a single individual on the south end of the island (Spring 1971).

Malaclemys terrapin This terrapin is common in bay side marshes. Arnold Norden found several hatchlings under a board during low tide (May 1971, North Beach). Mr. Miles Handcock, of Chincoteague, for years made a living catching these turtles for market. He states that during high tide the adults move into shallow bays and inlets to feed. Large numbers could be collected in nets when they headed for deeper water during out-going tides. Mr. Handcock stated that large females nest after the first full moon in July, and that the smaller terrapins nest after the following full moon.

Chrys~~t~~emys picta Painted turtles are moderately common in the fresh water impoundments.

Chrysemys rubriventris These turtles are occasionally seen sunning in the fresh water impoundments

Caretta caretta A hatchling release program has been going on for the last four years in an attempt to establish a nesting population of loggerheads on this island. It is too early to know of its success. Since local newspaper accounts have covered this subject at various times over the last three years and Steve Graham is presently preparing an article on *Caretta* for the *Bulletin*, I see little need in discussing this species in depth at this time. The first reported nesting for Assateague Island was in the summer of 1972; the eggs failed to hatch.

Chelonia mydas I notice that Harris (1969) indicates a specimen of the green sea turtle from Sinepunant Bay. I am not aware of any additional records of this species from the area.

It is interesting to note that of the nineteen species of amphibians and reptiles reported above, seven are known only from a few individuals and are, at best, very uncommon on the island. There are fifteen species of amphibians that are known from the mainland, immediately adjacent to Assateague, that apparently do not occur on the island Three lizards and eleven snakes have similar distributions. All of the snakes presently known on Assateague Island, with the possible exceptions of *Thamnophis* and *Opheodrys*, are large and/or heavy-bodied species that would appear capable of swimming to the island. Most of the aquatic turtles that are known from the southern Del-Mar-Va are present (except the musk turtle)

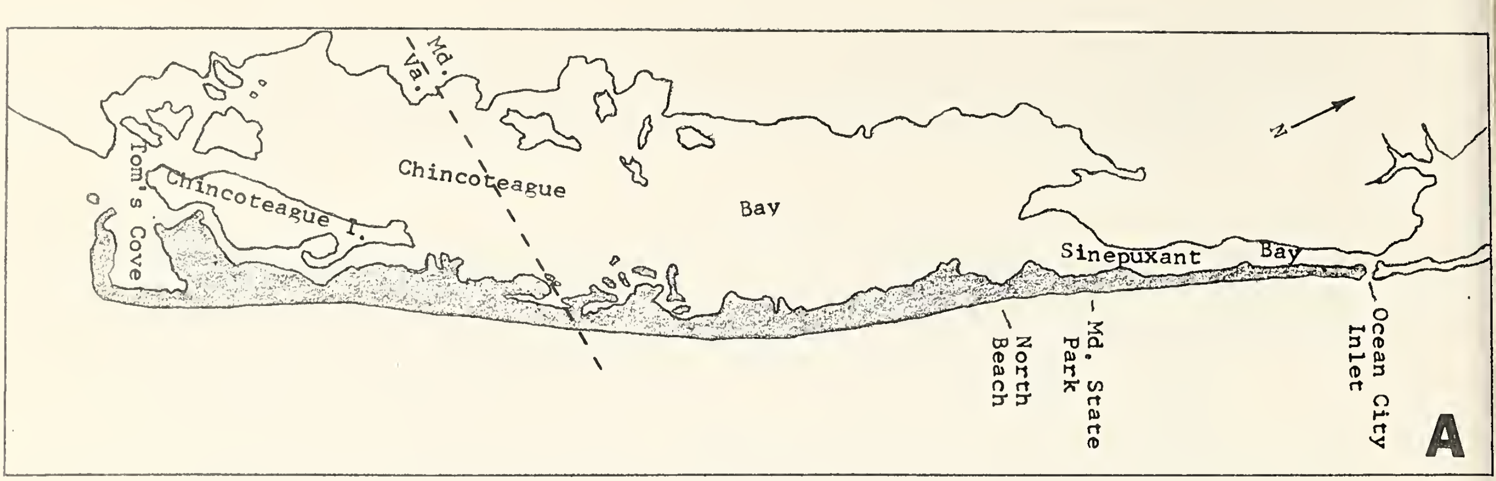

Fig. 1. A. Assateague Island

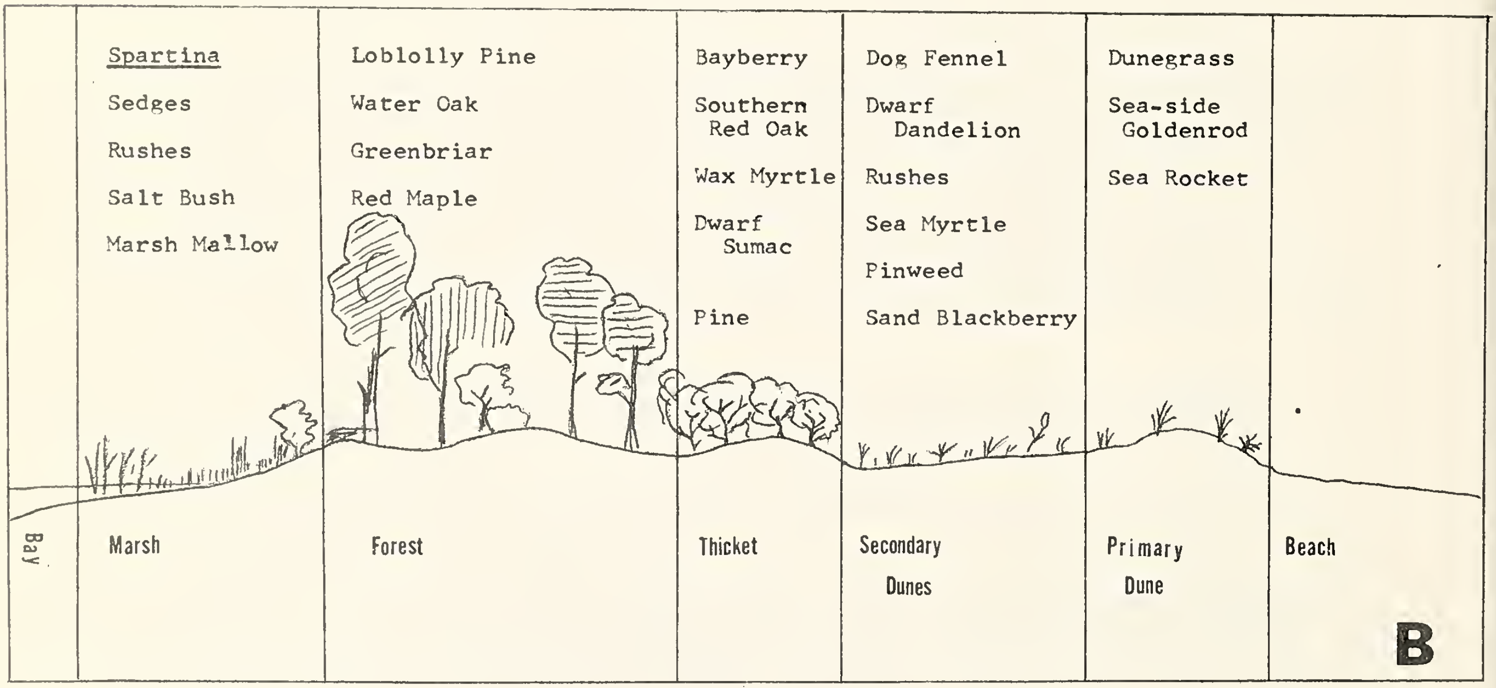

Fig. 1. B. Over simplified cross section of plant communities on Assateague. Modified from W.E. Martin, 1959. *Ecological Monographs* Vol. 29.

while the terrestrial box turtle is not. The musk turtle and broad headed skink occur on Fenwick Island to the north and should be looked for on Assateague as well. The three amphibians known from the island are common species with wide ecological tolerances, both as larvae and adults.

Acknowledgements: I would like to thank Jean Worthley, Arnold Norden, Dick Franz, Peter Hertil and Barbara Rothgaber for assistance in the field and/or information on reptiles and amphibians of the island.

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Department of Mammalogy, Natural History Society of Maryland, 2643 North Charles Street, Baltimore, Maryland.

Received 25 October 1972

Observations on Snakes in the Burrows of Mole Crickets

Two common north-central Florida snakes were found in association with mole cricket burrows under a street light in Gainesville, Florida on 2 March 1971 (approx. 8:30 PM). The first snake, a juvenile *Farancia abacura*, 24 cm. in total length, was discovered as his head and two cm. of his body emerged from one of the burrows. The second snake, an adult *Seminatrix pygaea*, 32 cm. long, was dug from the loose earth within one foot of the *Farancia*. The air temperature at the time of capture was approximately 69°F, the air was humid, and the moon was full but partially covered with clouds. Two days before, mole crickets were swarming in large numbers around this street light and burrowing in the earth under it. It is not known what relationships, if any, exist between these insects and the two species of snakes.

—Sylvia Scudder, *Dept. of Natural Sciences, Florida State Museum, Gainesville, Florida, 32601*, and Kirby Bourgeois.

Received 30 October 1972

Recent Amphibians of Nate Harrison Grade, Palomar Mountain, San Diego County, California

From April 1970 to April 1972, a repitive pitfall sampling study was carried out along Nate Harrison Grade, west slope of Palomar Mountain, San Diego County, California. Palomar Mountain is located 40 miles north of San Diego and 25 miles east of the Pacific Ocean.

Historically, research on amphibians has not been directed to this particular geographic area. However, Jameson, Mackey and Richmond (1966) studied *Hyla regilla* in San Diego County, Sloan (1964) provided a non-technical guide to amphibians found in San Diego County. Brame and Murray (1968) reported on *Batrachoseps* from Southern California.

Since the beginning of this study in April 1970, five genera of amphibians have been collected. These include three salamanders: *Batrachoseps attenuatus leucopus*, *Ensatina eschscholtzi eschscholtzi*, and *Aneides lugubris lugubris*, and two anurans: *Bufo boreas halophilus* and *Hyla regilla*. Altitudinal occurrences are shown in Figure 1. Seasonal occurrences are shown in Figure 2.

The climate and topography of the Nate Harrison Grade lends interest to the ecology of amphibian distribution, owing to the wide variation within a comparatively short distance. Palomar Mountain is 6,100 feet above sea level at the highest point. Our sampling transect began at 4,500 feet and terminated at 1,300 feet. Temperature extremes tend to be relatively mild with a high usually in August of approximately 100° F and a low usually in February of approximately 20° F.

Precipitation varies from an annual fall of approximately 30 inches at 4,500 feet to 16 inches at 1,300 feet above sea level. Snowfall normally does not occur lower than 3,200 feet and then only amounts to a minimal ground covering.

Three basic floral zones can be categorized along the sampling transect. The top, 3,000 up (above station 30) is above the forest boundary. While 2,000 feet to 3,000 feet (stations 31 to 48) constitute the high chaparral region, and below 2,000 feet (stations 48 to 63) enters into a scrub brush area. Pauma Creek and Jaybird Creek flow nearby the sampling transect, especially close to station 35 (2,800 feet). Below 1,300 feet orange groves are quite abundant and a man-made reservoir is located nearby station 54 (1,691 feet). Vegetation generally associated with the highest concentration of specimens collected appeared to be *Abies concolor*, *Eriophyllum confertiflorum*, *Pseudotsuga macrocarpa* (3,000 feet up) and *Salvia apiana*, *Artemisia douglasiana*, *Hetermeles arbutifolia*, *Adenostoma fasciculatum* (1,300 feet to 3,000 feet).

Locating sampling stations and setting out pitfall traps was completed 4 April 1970. All 63 stations were located at approximate 0.1 mile speedometer intervals. Four containers were set at each station for a total of 252 pitfall traps. These 63

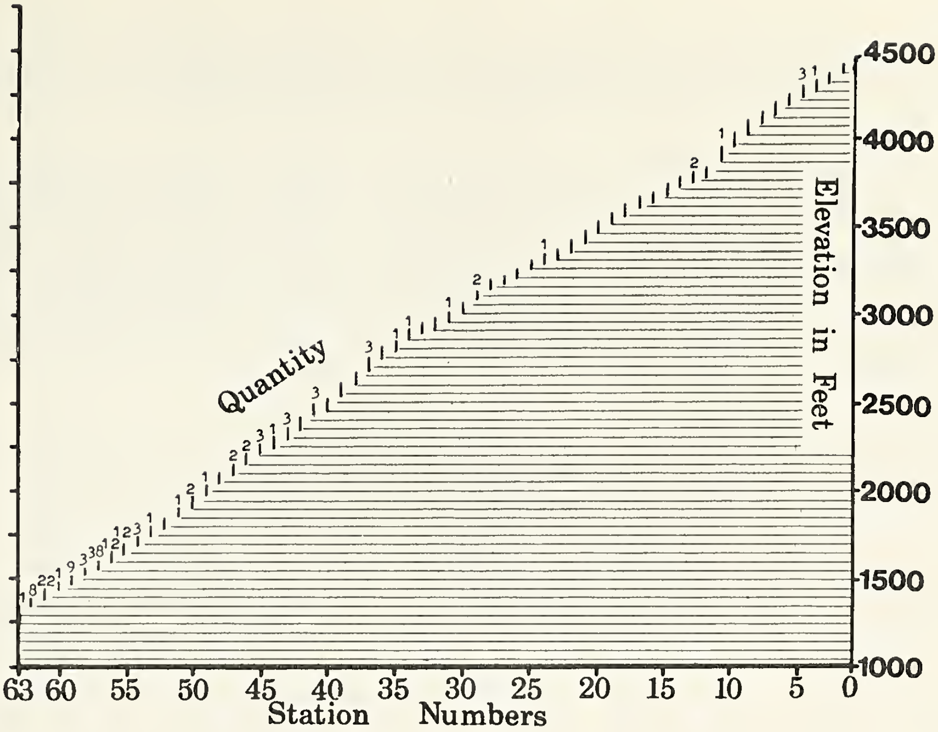

Figure 1. Altitudinal Occurrences

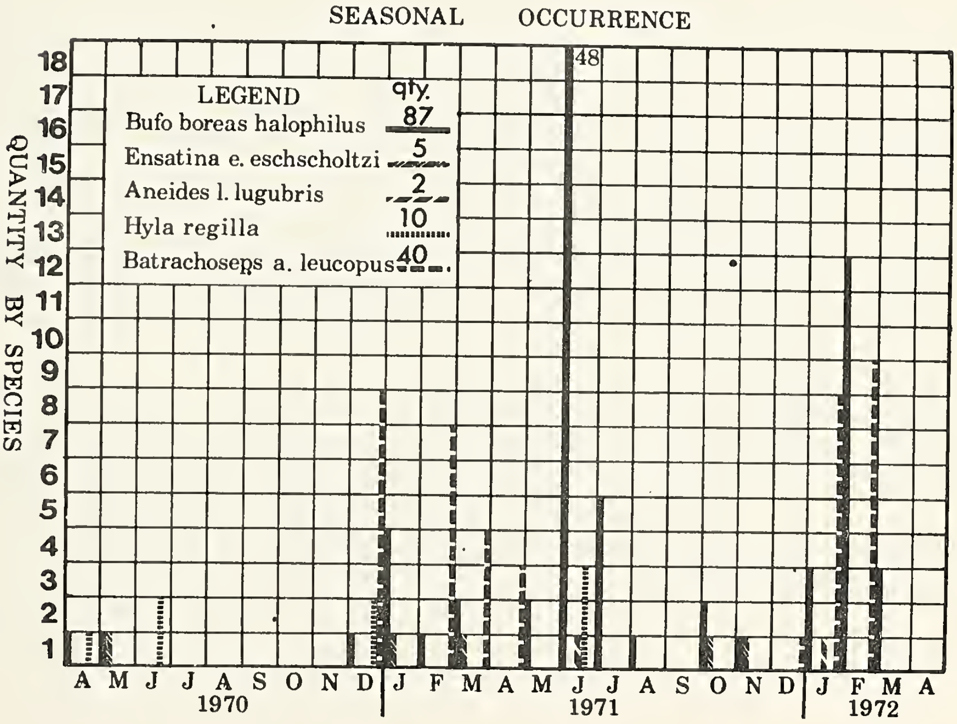

Figure 2. Seasonal Occurrences

stations were distributed over the 6.9 miles of Nate Harrison Grade. To assist in locating the stations during the weekly checks each station was designated by a red plastic strip tied to a bush or other conspicuous object.

The containers used for the pitfall traps were basically wide-mouthed containers, ranging in capacity from one to four gallons. The pitfalls were buried in the ground with the mouths at ground level as previously described by Banta (1957). A light wooden cover was then placed over the mouth of each trap. Small rocks or other available debris were then used to provide a space between the covering and the ground and trap opening. A rock or other weighted object, was then placed on top of the cover to prevent the wind from blowing the covers off.

Weekly visits were made to the sampling area to check the traps and to remove and preserve the specimens entrapped. Printed station identification labels were placed in each jar containing specimens from each station on a given date. Forms were mimeographed for use in keeping track of the results. These weekly visits were made for a two year period, commencing 11 April 1970 and ending 11 April 1972, at which time all pitfall traps were removed and the remaining holes filled-in in an attempt to return the area as to a natural state as when the study was initiated.

The amphibians which were obtained in and around the sampling stations were usually preserved in the field, eventually sorted out from the jars for each station, systematically catalogued and tagged for future identification. All specimens are deposited in the collections of the San Diego Society of Natural History.

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—Arnold L. Powers and Benjamin H. Banta, *United States International University, San Diego Campus, San Diego, California 92124*.

Received 8 November 1972

MARYLAND HERPETOLOGY

Publish your field notes concerning Maryland amphibians and reptiles in this brand new addition to the BULLETIN of the Maryland Herpetological Society. We can utilize all manner of notes, particularly, those dealing with reproduction and life history, feeding, predation, unusual locality records, unusual behavior (and also the usual), etc. Brief accounts containing 75 words or less including the common name, locality (county, specific location), date, observation (eliminate unnecessary words, use phrases where possible, author's name (no address) should be sent to RICHARD FRANZ, DIVISION OF NATURAL SCIENCES, FLORIDA STATE MUSEUM, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA, 32601. We especially welcome notes from younger members.

72-0007. *Spotted Salamander*, Baltimore Co., near Hampton House, 1 mi. N of Towson, 17 March 1972, newly deposited eggs.

Joy Wheeler

72-0008. *Spotted Salamander*, Calvert Co., Battle Creek Cypress Swamp, 23 April 1972, eggs with associated algae in process of hatching.

Dave Stout

72-0009. *Tiger Salamander*, Kent Co., Massey Pond, 3 mature larvae collected 17 June 1972, transformed in captivity 29 June at the following sizes- SVL/TL, 62/120, 60/117, 55/115 mm.

L. Richard Franz

72-0010. *frogs*, Garrett Co., Cranesville Rd., Swallow Falls S.F., 2 July 1972, cold (low 50s) rainy night, large choruses of spring peepers calling, smaller choruses of green frogs (30-40) and American toads (25-30) in marshes along road.

Walter Marchant

72-0011. *Northern Fence Lizard*, Allegany Co., Piney Mt. (escarpment to Alleghany Plateau), near LaVale, sizeable colony, 4.5 mi. W of Fort Hill High School at Cumberland, formerly the most western known population (reported by Ken Hodgen).

David S. Lee

72-0012. *Six-lined Racerunner*, Anne Arundel Co., 2 October 1972, observed 10 young (SVL 32-36 mm.) feeding on immature field crickets at 3 PM.

John D. Groves

72-0013. *Eastern Milk Snake*, Baltimore City, Cylburn Park, 25 August 1972, upon capture a 9 inch specimen reguratated new born eastern garter snake.

John D. Groves

72-0014. *Black Rat Snake*, Carroll Co., Henryton, 13 August 1967, 14 inch specimen found feeding on 5 inch fence lizard at 6:30 PM.

John D. Groves

NEWS & NOTES

EASTERN SEABOARD HERPETOLOGICAL LEAGUE MEETING AT TAKOMA PARK:

On October 29, 1972, more than 100 members and representatives of the East Coast regional herpetological societies from Connecticut to Florida met at Takoma Park, Maryland for the first semiannual meeting of the Eastern Seaboard Herpetological League. Dr. Lester E. Harris, Jr., Head, Biology Department, Columbia Union College, hosted the meeting which was sponsored by MdHS, NVHA, and VHS.

In his welcoming address, ESHL Coordinator, Robert G. Tuck, Jr., reviewed the history and background of the League which culminated in its "official" founding last April in Philadelphia. ESHL was organized to provide for discussion and coordination of joint or individual herpetological projects involving species whose range covers areas shared by the various constituent groups, especially conservation of rare and endangered species and related areas of concern such as importation of such species. Bob expressed the feelings of all of us in thanking Dr. Harris for his gracious hospitality in allowing us the use of the campus Science Building and for his personal efforts to make the meeting a success.

In his introductory remarks, Dr. Harris presented background on the work he is doing on rattlesnakes and rattlesnake venoms. His work primarily involves isolation and identification of the various protein components of venoms as well as tracing target areas of these components. Particularly noteworthy is Dr. Harris' success in maintenance and care of the animals used for his studies. To the delight of everyone, he carefully exhibited his unique caging and feeding system, which includes opaque screening to prevent undue disturbance of the snakes, a sliding drawer arrangement for watering, and a modified caulking gun for introducing prey through a small opening at the end of each cage (which opening, needless to say, is carefully corked at all other times).

The keynote address was delivered by Dr. R. Bruce Bury, Chief, Herpetology Section, Bird and Mammal Laboratories, Bureau of Sport Fisheries, U.S. Department of the Interior, who spoke on recent conservation legislation and its impact on herpetologists. He described the reasons for protecting reptiles and amphibians, reviewed the history of conservation legislation as it relates to herptiles, and discussed the impact of recent laws and regulations, emphasizing the role of individual herpetologists and regional societies. Reptiles and amphibians are badly in need of protection due to the continued importation of over two million of these animals into the U.S. each year, as well as the flourishing pet trade in native species, commercial exploitation of crocodilian and sea turtle parts and products, local habitat destruction due to human population pressures and resulting development, and the general ignorance and misinformation that results in indiscriminate killing of herptiles. By way of reinforcement, Dr. Bury offered several positive arguments for saving reptiles and amphibians, including mention of their place as an integral part of our wildlife and the importance of all species in maintaining the stability of the ecosystem. Their scientific importance is well established, especially in the medical field, in genetics and evolutionary studies, and as material for training biologists and doctors. Perhaps one of the most important, if overlooked, reasons for saving these animals is their role in fulfilling the basic need for diversity in the human environment, for the recreational and educational benefits they provide us and their aesthetic value.

From there, Dr. Bury moved on to a comprehensive review of pertinent laws and regulations for the protection of foreign and native endangered species, effective on the international, national, and state levels. These laws and regulations can be made more effective only if herpetologists and others interested in conservation will become familiar with them and use them. Four such tools effective on an international level are the IUCN Red Book which includes rare, endangered, and depleted reptiles and amphibians of the world, the International Convention, the U.S. Foreign Endangered Species List, and the Lacey Act. Dr. Bury briefly discussed the 1969 U.S. Endangered Species Act, the Red Data Book, and recovery programs under that Act, and reminded us that the 1972 Act is effectively dead for this year. Hopefully a new version of it will be introduced and passed early in the ninety-third Congress. With respect to state programs, New York, Connecticut, and California have banned importation of crocodile and alligator skins and parts; California has added sea turtles, poisonous snakes and snapping turtles to the above prohibitions; and Maryland, Pennsylvania, and Illinois are following suit. The bog turtle is now protected in New York, Pennsylvania, and Maryland. Dr. Bury dwelt extensively on the California program which is the most progressive to date in terms of regulation of the pet trade and control of collecting. Fourteen rare or endangered species and subspecies are fully protected, with fines and jail terms for violators; in addition bag limits have been imposed on the taking and possession of twenty-seven others. Nevertheless, as was emphasized repeatedly, the problems of enforcement of protective legislation on all levels remains largely unresolved.

In discussing the impact of recent laws and regulations, Dr. Bury stressed the role and responsibility of herpetologists and societies in protecting endangered reptiles and amphibians. Maryland, California, and Texas are notable examples of the accomplishments of individual herpetologists and regional societies in getting these animals on the state lists. Habitat purchase is another direction in which we can move; the Nature Conservancy bought an area for the Texas blind salamander and California has similar plans for protection of the Santa Cruz long-toed salamander. Increased protection of foreign species will stem from the International Convention and, hopefully, from new federal legislation. Effective regulation of the pet trade is essential: We must end the business in threatened animals. Boycott of dealers who advertize endangered forms is one avenue, and any other efforts to reduce the market for such animals will help natural populations. Underlying all of the above is the need for studies on the effects of collecting, i.e., population studies.

Overall, few species and subspecies of reptiles and amphibians are now protected from uncontrolled collecting by researchers, fanciers, and the pet trade. At this point, the survival of extant herptiles is our responsibility individually and collectively. Dr. Bury repeatedly stressed the need for cooperative efforts by herpetologists in line with the resolutions adopted by ASIH in 1971 and by SSAR at the Lake Texoma meeting in 1972. He urged the promotion of the conservation ethic among our colleagues; increased involvement in activities with established organizations and committees, especially the ASIH committee and the HL-SSAR joint committee; and, on the personal level, adoption of an attitude of giving priority to the health and future of the animals rather than one's own collection. In conclusion, reasonable demands for pets can continue and studies can continue unimpaired only if threatened forms are adequately protected by us.

Jaren G. Horsley, Curator, Division of Amphibians and Reptiles, National Zoo, spoke on the changing role and responsibilities of the public zoo in light of today's need for protection of animals. He prefaced his remarks by defining a herpetologist as anyone with sufficient interest in amphibians and reptiles to study them. It is the responsibility of amateur and professional alike to refrain from indiscriminate and nonessential collecting and to take whatever steps may be necessary to preserve natural gene pools. Challenging the necessity for much of the mass collecting which takes place in the name of research, Mr. Horsley suggested studying animals in their environment or returning them to their environment. At least have a valid, well-designed research project set up prior to collection rather than decimating a population and then thinking up a project to justify it. We all should give serious, honest thought to the question of why we are keeping animals: an animal in captivity is a dead animal as far as the population is concerned unless one is engaged in serious breeding/raising and release projects. Mr. Horsley had especially harsh words for those whose collecting is an outgrowth of status-seeking. In many cases we cannot properly assess the effects of collecting on a particular population because of the inadequacy or total absence of population data. How do we know, for example, how numerous a species really is or if it is depleted? How do we know that we are not taking the last specimen in a particular population? Population research is not only essential from the standpoint of conservation but is an example of the kind of valid and acceptable research project which can be undertaken without serious damage to the forms studied.

How does the public zoo fit in with these demands? Mr. Horsley is working to implement his own conservation ethic at the National Zoo, principally in trying to change its functions as well as the public's idea of what a zoo should be. To him, too many zoos in the past have been merely sterile collections of exotic animals, the larger the collection and the more exotic the better. No attempts were made to show the relation of animal environment. The new image stresses awareness and education; well-planned exhibits dealing with native fauna, their life histories, and the roles they play in food chains and other ecological aspects of their habitat will hopefully promote an appreciation for the value of conservation. The modern zoo is also increasingly engaged in research, especially in the area of breeding threatened forms, and cooperative efforts for the preservation of animals and habitats.

This change in the nature of zoos has gained acceleration in the past decade, facilitated by a growing public awareness of the detrimental impact of development and human population increases.

Following a short break, during which we toured Dr. Harris' rattlesnake laboratory, Saul Friess (NYHS) showed a series of slides taken during several visits to a private zoo in New Jersey. His presentation gave us a depressing glimpse not only of incredibly inhumane treatment of animals but also of human greed and callousness. Among other sights, we were treated to the spectacle of alligators immobilized in virtually freezing water and snow in a concrete-bottomed trough and Aldabra tortoises, likewise immobile and apparently dying, literally piled into one end of an unheated barn. The fact that these animals are doomed is of no real concern to the owners of such enterprises because the cost of replacement is figured in thousands of dollars as opposed to profits to the tune of several million. It goes without saying that the populations of these animals cannot stand this wholesale destruction. In the case of the establishment visited by Mr. Friess, inadequate protective legislation combined with local politics has thus far made effective action impossible. This, combined with public ignorance and the growing popularity and proliferation of this type of enterprise leaves little hope for many species of exotic animals. Mr. Friess' presentation was offered as an example of the serious threats to the continued existence of these animals and a plea for increased efforts on all fronts to save them..

In a lighter vein, Bob Tuck then announced the institution of the ESHL Hedge Toad Awards for outstanding contributions to the furthering of cooperation among herpetologists and regional societies. Awards were present to Frank J. Tobey, Jr., Secretary, VHS, to I. Gilboa of HISS, and to James A. Peters, U.S. National Museum (in absentia).

Special guest lecturer, Dr. W. Leslie Burger of the U.S. National Museum briefed us on his work on pitviper genera, specifically his proposed reclassification and arrangement of genera in Eastern Asia and the Western Hemisphere to reflect both his hypothesized phylogeny and the occurrence of convenient evolutionary gaps. With the aid of blackboard diagrams, Dr. Burger carefully explained his theory of the evolution and zoogeography of this group on which he has based his proposals. This included such information as the anatomical similarity between arboreal and ground-dwelling forms in Central America and a like similarity between specimens occupying these two niches in South America.

Ernest G. Hofmann, Senior Editor of the NYHS Bulletin "Herp" spoke briefly and showed slides on his success breeding leopard geckoes in captivity. He carefully detailed humidity and temperature requirements, particularly stressing the differences in requirements between young and mature individuals. The progressive change in color patterns as these lizards mature, from a banded to a spotted effect, was strikingly displayed.

Saul Friess, in contrast to his earlier presentation, delighted the group with an extensive slide lecture on his methods of successfully hatching snake and other reptile eggs. His comprehensive lecture dealt primarily with the major problems encountered; among the factors covered were maintaining satisfactory temperature and humidity levels, the use of an effective fungicide solution, and the marking of eggs to avoid their being turned over during the incubation period. Many of his clutches of eggs were removed from areas where the environment was being destroyed and the hatchlings later released in suitable habitats. A highlight of his tale was his display of an NYHS educational program poster bearing one of his photographs of three pine snakes in the process of hatching. The poster title was "Three Good Eggs" and stressed the usefulness and harmlessness of these snakes.

ESHL organizational representatives met in the Science Building Library during the last hour of the program to conduct business. Following a lively debate motions were passed to establish the terms of ESHL officers and provide for biennial elections and to establish the ESHL treasury as a separate fund maintained by the regional society with which the Coordinator is associated. In addition the following resolution was unanimously adopted:

WHEREAS, Carl Kauffeld has for many years encouraged and been active in the field of local or amateur herpetological societies;

AND WHEREAS, Carl Kauffeld was instrumental in hosting a joint meeting of such societies at the Staten Island Zoo in October of 1971, which meeting was a forerunner of the Eastern Seaboard Herpetological League;

AND WHEREAS, he was recently taken ill and hospitalized; and we wish to express our concern and our affection for him;

NOW THEREFORE BE IT RESOLVED:

THAT, the EASTERN SEABOARD HERPETOLOGICAL LEAGUE extends to CARL KAUFFELD this expression of our respect and affection, our concern over his illness, and our sincere hope for his early and complete recovery.

Margaret M. Thomas
ESHL- Secretary

Natural History Society of Maryland
Maryland Herpetological Society

Cloth patches of the Maryland Herpetological Society (as illustrated above) are still available to members or non-members at the cost of $2.00 each or 3 for $5.00. They are in limited supply so order promptly. These patches are of the finest quality and look very good on field jackets ... order yours now!

Send check or money order, made payable to the Maryland Herpetological Society, Maryland, 2643 N. Charles St., Baltimore, Maryland 21218.

Editor's Note:

The revision and republication of the Distribution Survey of Maryland and the District of Columbia is scheduled for the December 1973 issue of the Bulletin of the Maryland Herpetological Society as initially planned. Since its publication in December 1969, three new amphibians & reptiles have been recorded for the state. Numerous range extensions, new county records, etc. have also been reported. All copies of the survey have been exhausted for some time now, and new requests continue to pour in.

Please check your data, and if you have any new material concerning the distribution of Maryland's amphibians or reptiles send it to:

Herbert S. Harris, Jr.
Curator, Dept. Herpetology
Nat. Hist. Soc. Md., Inc.
2643 N. Charles Street
Baltimore, Maryland 21218

I will acknowledge all data received in the forthcoming survey. With your help, we will try and make this revision of the Distributional Survey as complete as possible. Thank you.

HSH

THE REPTILES OF MARYLAND AND THE DISTRICT OF COLUMBIA

by Robert H. McCauley, Jr.
United States Public Health Service

A carefully detailed coverage of the distribution (known in 1945) and life histories of Maryland snakes, lizards and turtles. Contains 194 pages, 46 distribution maps, black and white photographs of 48 forms, and a comprehensive bibliography to 1945. $1.85 postpaid. Order from: Natural History Society of Maryland, 2643 N. Charles Street, Baltimore, Maryland 21218.

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